

2014 NBIS QA REVIEW

SUMMARY REPORT

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Prepared for:

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Bureau of Bridges & Structures

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TABLE OF CONTENTS

1. PROGRAM MANAGEMENT 1

2. ROUTINE NBIS INSPECTIONS..... 2

3. UNDERWATER INSPECTIONS 3

4. FRACTURE CRITICAL MEMBER INSPECTIONS..... 4

5. SPECIAL INSPECTIONS 4

6. SCOUR EVALUATIONS 5

7. LOAD RATING 5

8. BRIDGE FILE 6

9. STRUCTURE MAINTENANCE 6

10. STRUCTURE SITE VISITS..... 6

11. CONCLUSIONS 12

12. 23 NBIS METRICS 14

INTRODUCTION

The Illinois Department of Transportation (IDOT) is required to perform Quality Assurance (QA) reviews of its bridge inspection practices in order to comply with the National Bridge Inspection Standard (NBIS). As part of the QA review, IDOT conducts process audits of selected districts and local agencies to document compliance with NBIS requirements.

For 2014, there was 1 IDOT District and 17 counties selected for review. Interviews of staff and field reviews at bridge sites were conducted from May 6, 2014 through September 16, 2014.

The interviews and site visits were conducted by representatives from Oates Associates, Inc. and the IDOT Bureau of Bridges & Structures (BBS). The reviews were typically attended by the agencies' Program Manager and Team Leaders. Representatives from the local IDOT districts and Federal Highway Administration (FHWA) also attended several reviews. A report was prepared for each agency that documented the review and noted program deficiencies.

This document summarizes the information gathered during the interviews and the observations made during the subsequent site visits. This report is intended as a summary of the State of Illinois' NBIS program. However, the information and findings are based only on the district and agencies reviewed and may not be representative of the State's entire NBIS program.

1. PROGRAM MANAGEMENT

1.1 Personnel

All of the agencies had Program Managers assigned who were approved by IDOT and were current on their required refresher training. All of the agencies had Team Leaders assigned who were approved by IDOT and were current on their required refresher training.

The NBIS program personnel consisted mainly of in-house staff. Consultants were contracted by the District and four counties to assist with various aspects of their NBIS programs.

1.2 Inventory & Scheduling

The agencies had inspection responsibilities for a total of 1,381 NBIS structures under state jurisdiction, 734 NBIS structures under county jurisdiction, and 2,598 NBIS structures under township jurisdiction. For purposes of this report, an NBIS structure is defined as a structure carrying a public roadway and greater than 20.0 feet in length. The inventory numbers presented in this report do not include non-NBIS structures and

are based on data downloaded from the Illinois Structure Information System (ISIS) prior to each agency's interview.

The District tracked inspection schedules in-house using IDOT's Bridge Inspection System (BIS). There were 7 of 17 counties that had developed in-house systems to track inspection schedules. There were 10 of 17 counties that relied on reports from IDOT to track inspection schedules.

1.4 Quality Control

IDOT Structural Services Manual Section 3.9.3.2 requires that at least once every 24 months, a Program Manager accompany each Team Leader functioning within their area of responsibility to observe their performance of NBIS inspection of at least three structures over the course of a 30 day period. The District and 3 of 17 counties were completing and documenting these reviews.

All of the agencies had an NBIS Team Leader on site during all inspections.

All of the agencies had Program Managers that reviewed every inspection report.

If an inspection had a critical finding, all of the agencies contacted the BBS for guidance.

The District and 9 of 17 counties had reviewed Section 3 of the 2013 IDOT Structural Services Manual.

2. ROUTINE NBIS INSPECTIONS

The agencies had a total of 1,695 NBIS structures with a 48 month routine NBIS inspection interval, 2,954 NBIS structures with a 24 month routine NBIS inspection interval, 62 NBIS structures with a 12 month routine NBIS inspection interval, and 2 NBIS structures with a less than 12 month routine NBIS inspection interval.

The District and 12 counties had routine NBIS inspection delinquencies. There was a total of one lower risk structure and no higher risk structures that were delinquent for their current routine NBIS inspection. There were a total of 434 lower risk structures and 86 higher risk structures that were delinquent for their previous routine NBIS inspection by less than four months (121 days or less delinquent). There were a total of 88 lower risk structures and 16 higher risk structures that were delinquent for their previous routine NBIS inspection by four months or more (122 days or more delinquent). The delinquencies were typically due to an agency's reliance on IDOT reports, inclement weather, high water, scheduling issues, staffing shortages, the agency trying to move the annual inspection date, or inspections being overlooked.

The District and 16 counties appeared to be completing quality routine NBIS inspections. The District inspection teams inspected from one to two structures in a typical day. The county inspection teams inspected from 3 to 24 structures in a typical day. One county recorded as many as 40 routine NBIS inspections in a single day according to ISIS data.

Inventory data was reviewed during routine NBIS inspections to varying degrees by the District and 15 counties.

Routine NBIS inspection documentation was reviewed. The District and 7 counties thoroughly documented routine NBIS inspection findings. There were 4 counties that did not include new condition ratings in the routine NBIS inspection reports implying that the previous ratings were still valid. There were 12 counties that did not consistently justify condition ratings of '5' or less. The District and 15 counties had the Team Leader sign-off on all of the routine NBIS inspection reports. The District and 13 counties had the Program Manager sign-off on all of the routine NBIS inspection reports. The District and 13 counties kept the original routine NBIS inspection reports with "wet" signatures in the bridge file.

3. UNDERWATER INSPECTIONS

The District and four counties had NBIS structures that required underwater inspections. There were a total of 60 NBIS structures with a 60 month underwater inspection interval, one NBIS structure with a 48 month underwater inspection interval, no NBIS structures with a 36 month underwater inspection interval, seven NBIS structures with a 24 month underwater inspection interval, and five NBIS structures with a 12 month underwater inspection interval.

The District and two of four counties had underwater inspection delinquencies. There was a total of one lower risk structure and no higher risk structures that were delinquent for their current underwater inspection. There were a total of five lower risk structures and one higher risk structure that were delinquent for their previous underwater inspection by less than four months (121 days or less delinquent). There was a total of one lower risk structure and one higher risk structure that were delinquent for their previous underwater inspection by four months or more (122 days or more delinquent). The delinquencies were typically due to high water, difficulties in scheduling the necessary equipment, and staffing shortages.

All of the agencies appeared to be completing quality underwater inspections. All of the agencies used a boat to complete underwater inspections.

Underwater inspection documentation was reviewed. The District and three of four counties thoroughly documented underwater inspection findings. Three of four counties supplemented IDOT underwater inspection forms with additional data documenting the

streambed elevations. The District had detailed documentation in the bridge file that described the underwater inspection procedures of each individual structure.

4. FRACTURE CRITICAL MEMBER INSPECTIONS

The District and eight counties had NBIS structures that required fracture critical member (FCM) inspections. There were a total of 104 NBIS structures with a 24 month FCM inspection interval, 23 NBIS structures with a 12 month FCM inspection interval, and no NBIS structures with a less than 12 month FCM inspection interval.

There were six of eight counties that had FCM inspection delinquencies. There were a total of two structures that were delinquent for their current FCM inspection. There were a total of 14 structures that were delinquent for their previous FCM inspection by less than four months (121 days or less delinquent). There were a total of eight structures that were delinquent for their previous FCM inspection by four months or more (122 days or more delinquent). The delinquencies were typically due to the agency not being aware that the structure was fracture critical, inclement weather, scheduling issues, difficulty accessing the FCMs, and inspections being overlooked.

The District and six of eight counties appeared to be completing quality FCM inspections. The District and two of eight counties had access to non-destructive evaluation (NDE) equipment. The District and six of eight counties had proper equipment to complete arm's length FCM inspections.

FCM inspection documentation was reviewed. Three of eight counties thoroughly documented FCM inspection findings. All of the agencies had sketches in the bridge files that clearly identified all of the FCMs. None of the agencies had detailed documentation in the bridge file that described the FCM inspection procedures of each individual structure.

5. SPECIAL INSPECTIONS

All of the agencies had NBIS structures that required special inspections. The agencies had a total of 35 NBIS structures with a 48 month special inspection interval, 46 NBIS structures with a 24 month special inspection interval, 76 NBIS structures with a 12 month special inspection interval, and 71 NBIS structures with a less than 12 month special inspection interval.

The District and 9 counties had special inspection delinquencies. There were no structures that were delinquent for their current special inspection. There were a total of 36 structures that were delinquent for their previous special inspection. The delinquencies were typically due to scheduling lane closures, inclement weather, high water, scheduling issues, inspections being overlooked, and data not being entered into ISIS.

The special inspection structures had ISIS Item Number 92C1 (Special Feature Type) coded 'A' (Structural Damage/Deterioration – Steel Superstructure Elements), 'B' (Structural Damage/Deterioration – Concrete Superstructure Elements), 'C' (Structural Damage/Deterioration – Timber Superstructure Elements), 'D' (Structural Damage/Deterioration – Steel Substructure Elements), 'E' (Structural Damage/Deterioration – Concrete Substructure Elements), 'F' (Structural Damage/Deterioration – Timber Substructure Elements), 'G' (Underwater Condition Inspection – Debris and/or Erodible Soils), 'I' (Underwater Condition Inspection – Spread Footings not adequately keyed into rock or protected from the effects of streambed scour), 'K' (Underwater Condition Inspection – Scour Critical Evaluation Monitoring), 'L' (Existing Streambed Scour Adjacent to Spread Footing), 'M' (Existing Streambed Scour Adjacent to Pile Supported Footing), 'P' (Embankment Movement or Settlement), 'Q' (Substructure Movement or Settlement), 'R' (Pin & Link in Multi-Girder (Redundant) Bridge), 'S' (Specifically Identified Problematic Structural Details), and 'Z' (Other).

All of the agencies appeared to be completing quality special inspections.

Special inspection documentation was reviewed. The District and six counties thoroughly documented inspection findings.

6. SCOUR EVALUATIONS

The District and 16 counties had completed scour critical evaluations for all structures over waterways. There was one NBIS structure that did not have a scour critical evaluation completed. The District and two counties had a total of 15 NBIS structures that were scour critical. All of the agencies had a scour plan of action (POA) complete for each scour critical structure.

Scour POA documentation was reviewed. The District and one of two counties appeared to regularly review and update the POAs. The District and one of two counties appeared to document field visits in accordance with the POAs.

7. LOAD RATING

All of the agencies had NBIS structures that required load posting. There were a total of 201 structures that were posted. There were 12 counties that had a total of 36 NBIS structures that were closed.

The BBS completed the load ratings for all of the agencies. All of the agencies notified IDOT of work that would affect the load rating of a structure.

All of the agencies regularly reviewed posting and closing signage. There were four counties that had a total of four NBIS structures that were improperly posted according to information in ISIS.

IDOT's load rating program was reviewed. In general, bridge load ratings appeared to be completed in accordance with the AASHTO Manual for Bridge Evaluations. The bridge load rating procedures followed several "unwritten rules" that were not documented in Section 4 of the 2013 IDOT Structural Services Manual. A few assumptions that were made appeared to be unconservative. Several errors were noted in the calculations and documentation of the bridge load ratings.

The bridge load ratings that were reviewed were documented on standard IDOT forms and sealed by an Illinois Licensed Structural Engineer.

8. BRIDGE FILE

All of the agencies had a bridge file system that was well organized and accessible to the inspection team. The bridge files for the District and 16 counties had all of the significant components present. The District and 9 counties had justification for the coding of Item 113 in the bridge file.

9. STRUCTURE MAINTENANCE

All of the agencies had in-house maintenance crews that were able to perform various bridge repair and preventative maintenance tasks. All of the agencies used routine NBIS inspections as their primary source for determining maintenance needs.

10. STRUCTURE SITE VISITS

Site visits were made to 142 structures. Condition ratings and inventory data items on the respective Master Structure Reports were compared with conditions observed in the field.

10.1 Structural Condition Ratings

Structural condition ratings were generally within the allowable tolerance of ± 1 . The following are common condition rating discrepancies noted during the site visits:

1. Item Number 58 (Deck Condition):
 - Should be rated less than '9' after the initial inspection.
 - For concrete slab bridges, should be rated the same as the Superstructure Condition (Item 59) using the superstructure rating criteria.

- For prestressed concrete box beam bridges without a 4" or thicker reinforced concrete overlay, should be rated the same as the Superstructure Condition (Item 59) using the superstructure rating criteria.
2. Item Number 59 (Superstructure Condition):
 - Should be rated less than '9' after the initial inspection.
 - Should account for leaking keyway joints.
 - Should account for independent beam movement.
 - Should account for longitudinal cracks in the beams.
 - Should account for section loss and partial failure of steel members.
 - Should account for potholes on top and efflorescence on bottom of the superstructure.
 3. Item Number 60 (Substructure Condition):
 - Should be rated less than '9' after the initial inspection.
 - Should account for piles and footings that are exposed due to scour.
 - Should account for the condition of substructure concrete.
 - Should account for cracks in pier pile encasements.
 - Should account for section loss in piles at ground line.
 4. Item Number 61 (Channel & Channel Protection Condition):
 - Should account for stream degradation and its affect on bank protection.
 - Should account for eroded endslopes and slopewall failures.
 - Should account for scour.
 - Should account for slope failure of banks.
 5. Item Number 113 (Scour Critical Evaluation)
 - Should account for observed scour at the substructure units and exposed footings.
 - Should be re-evaluated when the Substructure Condition (Item 60) rating is '4' or less due to scour.

10.2 Inventory Data

The following are common inventory data discrepancies noted during the site visits:

1. Item Number 8A1 (Bridge Remarks (General)):
 - Should note unique or mixed main structure types.
 - Should note any discrepancy with the structure number.
 - Should note variable skews.
2. Item Number 27 (Construction Type Indicator):
 - Should be used to indicate reconstruction when applicable.
 - Should be verified for accuracy.

3. Item Number 27A (Construction Year):
 - Should identify the year of reconstruction when applicable.
 - Should be verified for accuracy.
4. Item Number 28 (Number of Lanes):
 - Should be verified for accuracy.
5. Item Number 32 (Approach Roadway Width):
 - Should be verified for accuracy.
 - Should be width of pavement and all weather shoulders.
6. Number 33 (Bridge Median Type):
 - Should be verified for accuracy.
7. Number 33A (Bridge Median Width):
 - Should be verified for accuracy.
8. Item Number 34 (Skew Direction):
 - Should be verified for accuracy.
9. Item Number 34A (Skew Angle):
 - Should be verified for accuracy.
10. Item Number 35 (Structure Flared Indicator):
 - Should be verified for accuracy.
11. Item Number 36A (Railing Appraisal (Bridge Railings)):
 - Should be verified that railings meet current standards.
 - Should be verified that railing may be acceptable for low ADT structures.
12. Item Number 36B (Railing Appraisal (Approach Guardrail Transition)):
 - Should be verified that transitions meet current standards.
13. Item Number 36C (Railing Appraisal (Approach Guardrail)):
 - Should be verified that guardrails meet current standards.
14. Item Number 36D (Railing Appraisal (Approach Guardrail Ends)):
 - Should be verified that ends meet current standards.
15. Item Number 36E/F (Guardrails on Structure Type (Right/Left)):
 - Should only identify guardrail in addition to the structure railing or parapet which is continuous with the guardrails located on the approaches.
16. Item Number 41 (Bridge Status):
 - Should be verified for accuracy.

- Should be verified for structures that have load postings.
 - Initial inspections must be performed and information entered into ISIS within 180 days after opening the bridge to traffic.
17. Item Number 42B (Type of Service Under):
- Should be verified for accuracy.
18. Item Number 43A (Main Structure Material):
- Should be verified for accuracy.
19. Item Number 43B (Main Structure Type):
- Should be verified for accuracy.
20. Item Number 44AN/AF (Near/Far Approach Span Material):
- Should be verified for accuracy.
21. Item Number 44BN/BF (Near/Far Approach Span Type):
- Should be verified for accuracy.
22. Item Number 45 (Total Number of Main Spans):
- Should be verified for accuracy.
23. Item Number 46 (Total Number of Approach Spans):
- Should be completed for all structures with a different approach span leading up to the main structure span.
 - Should be verified for accuracy.
24. Item Number 48 (Length of Longest Span):
- Should be verified for accuracy.
 - Should be measured along centerline of roadway.
25. Item Number 49 (Structure Length):
- Should be verified for accuracy.
 - Should be measured along centerline of roadway.
26. Item Number 50A/B (Sidewalk Width On (Right/Left)):
- Should be verified for accuracy.
 - Should be left blank for brush or safety curbs less than 18 inches wide from the face of bridge railing.
27. Item Number 51 (Total Bridge Roadway Width On):
- Should be verified for accuracy.
28. Item Number 52 (Total Deck Width):
- Should be verified for accuracy.

29. Item Number 55B1 (Railroad Lateral Underclearance):
 - Should be verified for accuracy.
30. Item Number 59C (Utilities Attached to Structure):
 - Should be verified to ensure all utilities attached to the structure are included.
 - Should be verified for accuracy.
31. Item Number 60A/B (Substructure Material (Abuts./Piers)):
 - Should be completed for all applicable structures.
32. Item Number 62A (Culvert Cells (Count)):
 - Should be completed for all culverts.
 - Should be verified for accuracy.
33. Item Number 62B (Culvert Cell Width (Ft.)):
 - Should be completed for all culverts.
 - Should be verified for accuracy.
34. Item Number 62C (Culvert Cell Height):
 - Should be completed for all culverts.
 - Should be verified for accuracy.
35. Item Number 62D (Culvert Opening Area (Sq. Ft.)):
 - Should be completed for all culverts.
 - Should be verified for accuracy.
36. Item Number 62E (Culvert Fill Depth):
 - Should be completed for all culverts with fill.
 - Should be verified for accuracy.
37. Item Number 70B2 (Posted Combination Vehicle Type 3S-1 Weight Limit):
 - Should be verified for accuracy.
38. Item Number 70C2 (Posted Combination Vehicle Type 3S-2 Weight Limit):
 - Should be verified for accuracy.
39. Item Number 72 (Approach Roadway Alignment Appraisal):
 - Should be based on the alignment's affect on operating speed.
40. Item Number 102 (One or Two Way Traffic):
 - Should be verified for accuracy.
41. Item Number 107 (Deck Structure Type):
 - Should be verified for accuracy.

- For prestressed concrete box beam bridges without a 4" or thicker reinforced concrete overlay, should be coded 'E' (Precast Prestressed Concrete Deck Beams).
- For channel beam bridges, should be coded 'D' (Precast Reinforced Concrete Deck Beams).

42. Item Number 107A (Deck Structure Thickness):

- Should be verified for accuracy.
- Should be the thickness of the predominant deck type.
- Should be the thickness of the planks for timber decks.
- For prestressed concrete box beam bridges without a 4" or thicker reinforced concrete overlay, should be the total depth of the PPC box beam.
- For channel beam bridges, should be the thickness of the beam flange, which is typically 5".

43. Item Number 108A (Type of Wearing Surface):

- Should be verified for accuracy.
- Should be coded as 'N' (Not Applicable) for structures without a structural decking system (i.e. structures with fill).

44. Item Number 108B (Type of Membrane):

- Should be verified for accuracy.

45. Item Number 108C (Deck Protection):

- Should be verified for accuracy.

46. Item Number 108D (Total Deck Thickness):

- Should be verified for accuracy.
- Should include the Deck Structure Thickness (Item 107A) plus overlay thickness when applicable.
- Should include the plank plus runner thickness for timber decks.
- Should be measured at the same location as Item Number 107A (Deck Structure Thickness).

47. Item Number 112 (AASHTO Bridge Length):

- Should be verified for accuracy.
- Should be measured along centerline of roadway.

11. **CONCLUSIONS**

11.1 **Summary of Deficiencies**

The following is a summary of deficiencies that were identified during this review:

1. Inventory & Scheduling:
 - There were 10 counties that relied on reports from IDOT to track inspection schedules.
2. Quality Control:
 - There were 14 counties that did not complete and document quality control field reviews similar to that prescribed in IDOT Structural Services Manual Section 3.9.3.2.
 - There were eight counties that had not reviewed Section 3 of the 2013 IDOT Structural Services Manual.
3. Routine NBIS Safety Inspections:
 - The District and 12 counties had routine NBIS inspection delinquencies.
 - There was one county that did not appear to be completing quality routine NBIS inspections.
 - There were two counties that did not review inventory data during routine NBIS inspections.
 - There were 10 counties that did not thoroughly document routine NBIS inspection findings.
 - There were four counties that did not include new condition ratings in the routine NBIS inspection reports.
 - There were 12 counties that did not consistently justify routine NBIS inspection condition ratings of '5' or less.
 - There were two counties that did not have the Team Leader sign-off on all routine NBIS inspection reports.
 - There were four counties that did not have the Program Manager sign-off on all routine NBIS inspection reports.
 - There were four counties that did not have the original routine NBIS inspection reports with "wet" signatures in the bridge file.
 - There were several common routine NBIS inspection condition rating and inventory data discrepancies noted for all agencies.
4. Underwater Inspections:
 - The District and two counties had underwater inspection delinquencies.
 - There was one county that did not thoroughly document underwater inspection findings.
 - The District and one county did not consistently document streambed elevations during underwater inspections.

- There were four counties that did not document underwater inspection procedures in the bridge file.
5. Fracture Critical Member Inspections:
- There were six counties that had FCM inspection delinquencies.
 - There were two counties that did not appear to be completing quality FCM inspections.
 - There were six counties that did not have access to NDE equipment.
 - There were two counties that did not have proper equipment to complete arm's length FCM inspections.
 - The District and five counties did not thoroughly document FCM inspection findings.
 - All agencies requiring FCM inspections did not document FCM inspection procedures in the bridge file.
6. Special Inspections:
- The District and nine counties had special inspection delinquencies.
 - There were 11 counties that did not thoroughly document special inspection findings.
7. Scour Evaluations:
- There was one county that had not completed scour critical evaluations for all structures over waterways.
 - There was one county that did not regularly review and update the POAs.
 - There was one county that did not document field visits in accordance with the POAs.
8. Load Ratings:
- There were four counties that had insufficiently posted structures.
 - IDOT's bridge load rating procedures followed several "unwritten rules" that were not documented in Section 4 of the IDOT Structural Services Manual.
 - There were assumptions made in the bridge load rating calculations that appeared to be unconservative.
 - There were errors noted in the calculations and documentation of the bridge load ratings.
9. Bridge File:
- There was one county that did not have all of the significant components present in the bridge file.
 - There were eight counties that did not have justification for the coding of Item 113 in the bridge file.

11.2 Recommendations

There are several changes that IDOT should consider to help improve the quality of the State's NBIS programs including:

1. Emphasize the importance of the previously noted deficiencies to all agencies throughout the state. This could be done by presenting the 2014 NBIS QA Review findings to relevant trade organizations such as the Illinois Association of County Engineers and the American Public Works Association - Illinois Chapter.
2. Provide the local agencies with additional tools to help track inspection schedules.
3. Provide more training for personnel at IDOT Districts who act as liaisons to the local agency NBIS programs.
4. Encourage all NBIS program personnel to become familiar with Section 3 of the 2013 Structural Services Manual.
5. Encourage local agencies to pool their resources so that a smaller number of inspection teams are completing a larger number of inspections each year.
6. Provide inspectors with clarification on the different ISIS Item 113 ratings and appropriate course of action for common scenarios.
7. Revise Section 4 of the 2013 Structural Services Manual to include all of the current policies and procedures governing Illinois load ratings.
8. Review load rating quality control procedures to help ensure that calculation and documentation errors are minimized.

12. 23 NBIS METRICS

Compliance with the 23 NBIS Metrics was not explicitly part of this review. However, the following are noted deficiencies that should be addressed in order for the State to achieve a higher level of compliance during future FHWA reviews:

Routine Inspection Frequency – Lower Risk Bridges (NBIS Metric 6)

The NBIS requires that each lower risk structure is inspected at regular intervals not to exceed its defined inspection frequencies. Lower risk structures are defined as those with superstructure and substructure, or culvert condition ratings of fair or better, and not requiring state legal load restriction.

There was one lower risk structure that was delinquent for its current routine NBIS inspection. There were 434 lower risk structures that were delinquent for their previous routine NBIS inspection by less than four months (less than or equal to 121 days delinquent). There were 88 lower risk structures that were delinquent for their previous routine NBIS inspection by four months or more (greater than or equal to 122 days delinquent).

Routine Inspection Frequency – Higher Risk Bridges (NBIS Metric 7)

The NBIS requires that each higher risk structure is inspected at regular intervals not to exceed its defined inspection frequencies. Higher risk structures are defined as those with superstructure and substructure, or culvert condition ratings of poor or worse, or are state legal load restricted.

There were 86 higher risk structures that were delinquent for their previous routine NBIS inspection by less than four months (less than or equal to 121 days delinquent). There were 16 higher risk structures that were delinquent for their previous routine NBIS inspection by four months or more (greater than or equal to 122 days delinquent).

Underwater Inspection Frequency – Lower Risk Bridges (NBIS Metric 8)

The NBIS requires that each lower risk structure that cannot be inspected visually at low water by wading or probing is inspected at regular intervals not to exceed their defined inspection frequencies. Lower risk structures are defined as those with substructure or culvert condition ratings of fair or better, and evaluated as not being scour critical.

There was one lower risk structure that was delinquent for its current underwater inspection. There were five lower risk structures that were delinquent for their previous underwater inspection by less than four months (less than or equal to 121 days delinquent). There was one lower risk structure that was delinquent for its previous underwater inspection by four months or more (greater than or equal to 122 days delinquent).

Underwater Inspection Frequency – Higher Risk Bridges (NBIS Metric 9)

The NBIS requires that each higher risk structure that cannot be inspected visually at low water by wading or probing is inspected at regular intervals not to exceed their defined inspection frequencies. Higher risk structures are defined as those with substructure or culvert condition ratings of poor or worse, or are evaluated as being scour critical.

There was one higher risk structure that was delinquent for its previous underwater inspection by less than four months (less than or equal to 121 days delinquent). There was one higher risk structure that was delinquent for its previous underwater inspection by four months or more (greater than or equal to 122 days delinquent).

Inspection Frequency – Fracture Critical Member (NBIS Metric 10)

The NBIS requires that all fracture critical members are inspected at regular intervals not to exceed their defined inspection frequencies.

There were two structures that were delinquent for their current FCM inspection. There were 14 structures that were delinquent for their previous fracture critical member inspection by less than four months (less than or equal to 121 days delinquent). There were eight structures that were delinquent for their previous fracture critical member inspection by four months or more (greater than or equal to 122 days delinquent).

Inspection Procedures – Quality Inspections (NBIS Metric 12)

The NBIS requires that each bridge is inspected with a nationally recognized acceptable inspection procedure, with the necessary quality of assessment, rating, and documentation.

There were several agencies with routine NBIS inspection and FCM inspection procedures that did not appear to provide quality assessments of the structures. There were several agencies that did not appear to have quality documentation of routine NBIS inspection, underwater inspection, FCM inspection, or special inspection findings.

Inspection Procedures – Post or Restrict (NBIS Metric 14)

The NBIS requires that structures be posted or restricted when the maximum unrestricted legal loads or State routine permit loads exceed that allowed under the operating rating or equivalent rating factor.

There were four structures that were posted higher than the required load posting.

Inspection Procedures – Bridge Files (NBIS Metric 15)

The NBIS requires that bridge files be prepared in order to maintain reports on the results of bridge inspections together with notations of any action taken to address the findings of such inspections, maintain relevant maintenance and inspection data to allow assessment of current bridge condition, and record the findings and results of bridge inspections on standard forms.

There was one county that did not have the most recent inspection reports in all of the bridge files.

Inspection Procedures – Fracture Critical Members (NBIS Metric 16)

The NBIS defines a fracture critical member (FCM) inspection as a hands-on inspection of a FCM or member component that may include visual and other non-destructive evaluation. A hands-on inspection is an inspection within arm's length of the

component. The locations of the FCMs must be identified and the FCM inspection frequency and inspection procedures described in the inspection records for each bridge requiring FCM inspections.

There were two counties that did not inspect all FCM's at arm's length. The District and eight counties did not have documentation of the FCM inspection procedures included in the bridge file.

Inspection Procedures – Underwater (NBIS Metric 17)

The NBIS requires that the locations of the underwater elements are identified and the underwater inspection frequency and inspection procedures are described in the inspection records for each bridge requiring underwater inspections.

There were four counties that did not have documentation of the underwater inspection procedures included in the bridge file.

Inspection Procedures – Scour Critical Bridges (NBIS Metric 18)

The NBIS requires that all bridges that are scour critical have a plan of action (POA) prepared to monitor known and potential deficiencies and to address critical findings. The bridges must also be monitored in accordance with the POA.

There was one county that completed field visits that were part of an implemented POA but the visits were not documented in accordance with the POA.

Inspection Procedures – QC/QA (NBIS Metric 20)

The NBIS requires that agencies assure systematic quality control (QC) and quality assurance (QA) procedures are used to maintain a high degree of accuracy and consistency in the inspection program. This includes periodic field reviews of inspection teams and independent reviews of inspection reports.

There were 14 counties that had not implemented and documented a formal independent field review program similar to that prescribed in IDOT Structural Services Manual Section 3.9.3.2.