National Bridge Inspection Standards & Bridge Maintenance Program Review
Ottawa County
May 23, 2019

By: Mark Stockman, PE, PS
CEAO Federal Bridge QA/QC Engineer

IN ATTENDANCE:

Jim Moore
Craig Miller
Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Ottawa County personnel, reviews of inspection and inventory data, and reviews of Ottawa County bridge records. The office evaluation assessed Ottawa County's organization, procedures, resources, and documentation regarding the inspection, inventory, and maintenance operations for bridges. In addition, field reviews of seven bridges were conducted to determine if ratings were consistent with the ODOT Coding Manual and FHWA Recording and Coding Guide and to determine if inventory items were coded correctly. The bridges were selected by Ottawa County to represent a variety of structure types and conditions. The bridges checked during the field review were:

SFN	CTY-RTE-SECT	TYPE	YEAR BUILT /REHAB	OVERALL LENGTH	County RATING	Suggested NBIS RATING
6230261	OTT T0067 00.660	195	1900	12'	7A	same
6238319	OTT C0042 00.750	353	1953	23'	5A	4A
6230377	OTT C0072 01.060	121	1935	39'	4A	same
6230113	OTT T0007 03.730	231	1975	94'	7A	same
6230067	OTT C0002 03.550	111	1950	34'	5A	same
6241344	OTT T0041 00.700	34A	1955	39'	6P	same
6238467	OTT T0046 01.410	231	1968	93'	4A	same

FINDINGS AND COMMENTS:

General

Ohio State statutes establish requirements governing the safety inspection of all bridges within the State borders. ODOT with participation of FHWA has developed the ODOT publication Bridge Inspection Manual, hereafter referred to as the Manual, which establishes guidance and requirements regarding bridge inspections within the State. FHWA has determined that ODOT guidance meets or exceeds the FHWA NBIS requirements.

The federal regulations for administering the NBIS are located in the Code of Federal Regulations 23 Highways – Part 650 Subpart C - National Bridge Inspection Standards. The regulations can be found at the following web site:
http://wwwcf.fhwa.dot.gov/legsregs/directives/fapg/cfr0650c.htm

Ohio currently rates bridge element conditions with a 1-4 scale. Summary items conform to the definitions and rating scales established by the NBIS. The NBIS do not require element level condition rating for County bridges unless they are on the expanded National Highway System (NHS) beginning October 1, 2014.

Ottawa County has inspection responsibilities for 113 bridges, 92 of which are longer than 20 feet in length and 21 which are 10 feet to 20 feet long. The NBIS inspection and load rating requirements only pertain to highway bridges in excess of 20' long on public roads. Review of the inventory span lengths showed that all bridges had the NBIS designation Y/N coded correctly.

The office review and the field review demonstrated that County personnel were inspecting and coding bridges in accordance with ODOT's Bridge Inspection Manual ("Manual").

Inspection Procedures

Ottawa County uses their own staff to do the inspections. Previous inspection reports are available at site for review. The inspections are marked on a paper copy then entered in SMS in the office. Comments are recorded on the inspection form and brought to the bridge. Photos are available for every bridge and are taken of defects during inspections.

The County indicated that an average of 8.1 inspections per day were completed in 2018. For Truss (pony/through/deck) it takes approximately 1 hour (2-3 hours FC). It takes 30 minutes for Bean/Girders, Slabs, and Culvert Bridges.

The County has 0 bridges that require a snooper for inspection.

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Ottawa County had all bridges inspected in 2018. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. There are currently no bridges that require inspection more frequently than one year. Bridge inspections are performed by two inspectors. One person inspects while the other takes notes and pictures. These roles are randomly switched during the inspection process so that inspectors are involved in the evaluations. Onsite concurrence of inspection condition ratings are discussed and compared to the condition evaluation descriptions in the ODOT Bridge Inspection Manual prior to completing the inspection report. Any critical findings are presented and discussed with the County Engineer and any other required personnel to determine course of action.

Qualification and Duties of Personnel

Mr. Ron Lajti is the County Engineer. He is a PE and PS. As such he is the final authority on the bridge inspection program. Mr. Lajti is also a Team Leader. He has 13 years of inspection related experience. Mr. Lajti took the Bridge Inspection Level 1 course in 2005 and Level 2 in 2006. He took a Bridge Inspection Refresher Training course in 2016. Mr. Lajti is a qualified Team Leader.

Mr. James P. Moore is the Program Manager, Reviewer, and Load Rating Engineer. Mr. Moore is a P.E. and has 27 years of inspection related experience. He took the Bridge Inspection Level 1 in1992 and Level 2 in 2010, SMS Training in 2013, the Bridge Inspection Refresher in 2018 and BrR training in 2019. Mr. Moore is qualified as Program Manager, Program Reviewer, and Load Rating Engineer.

Mr. Craig Miller is a Team Leader. He has 7 years of inspection related experience. Mr. Miller took the Bridge Inspection Level 1 and Level 2 in 2012. He also took the SMS Training in 2013 and Inspection Refresher Training in 2018. Mr. Miller is a qualified Team Leader.

Inspection Reports

As part of this review, seven bridges were field reviewed to compare conditions with the most recent inspection report. The individual condition ratings for all seven bridges properly reflected the field conditions within the tolerance of 1 rating value when compared to the Manual. Summary ratings correspond with the NBIS inspection items.

Inventory Items

During the Field Review, the CEAO QA/QC Engineer checked select inventory items and the following issues were found:

- SFN 6238319
  - Scour Critical Rating should be changed from 8 to 5. It is stable and within footer limits instead and not above footer limits.
  - The Superstructure Arch item c27 should be coded 3, not 2. The Summary and General Appraisal would drop from 5 to 4.
- SFN 6230377
  - Scour Critical Rating should be changed from 8 to 5. It is stable and within footer limits and not above footer limits.
  - Approach Alignment Item 72 should be coded 8 not 6.
  - The abutment is a wall type, do not rate item c34 Abutment Caps
  - Deck item c7.1 Floor/Slab is coded 2. If the Summary is 4, the Floor/Slab must be coded a 3.
  - Channel Alignment should be 2 due to the flow along 1 abutment
- SFN 6230113
  - Scour Critical Rating should be changed from 8 to 5. It is stable and within footer limits and not above footer limits.

- SFN 6230067
    - Scour Critical Rating should be changed from 8 to 5. It is stable and within footer limits and not above footer limits.
    - The Approach Alignment should be changed from 6 to 8.
- SFN 6241344
    - Scour Critical Rating should be changed from 8 to 5. It is stable and within footer limits and not above footer limits.
- SFN 6238467
    - Comments should reflect 9 strands discounted. Currently states 8 exposed. Load rating should be reviewed to be sure it reflects the number of strands discounted. **UPDATE**. The county reran the load ratings and decided to post the bridge.

Files

Ottawa County maintains bridge files in permanent files. Inspection reports, including old inspections are organized by inspection year. Design Calculations are organized by project. Plans are kept in a pipe rack and scans. Load analysis calculations, repairs and maintenance history, scour evaluations, scour POA, Fracture critical files, and load posting/closing are all organized by bridge in the permanent files. Special inspection equipment or procedures are kept on FC plans. Flood data, waterway adequacy, channel cross sections are kept on plans and photos electronically.

Load Rating

The inventory shows 223 (100.00%) of the County bridges have been Load Rated or Load Rating was not applicable. There were 14 bridges evaluated by documented engineering judgement. There were minor coding errors the SMS load rating page on several bridges. The county will check and make corrections if needed.

Load Ratings were checked for SFNs 623846, 6230113, and 6241344. The load posting at the bridge matched the load rating on all bridges. P.E. name and stamp were on all load ratings.

Load Posting

Ottawa County has 13 bridges that are load posted. This is determined by analysis. There are 0 bridges that closed for condition ratings. They use SHV signage. Posting is based on Operating Rating.

Special Features

Ottawa County does not have any bridges that have special features.

Fracture Critical Bridges

Ottawa County has 27 bridges labeled as a fracture critical bridge in the SMS. There are 26 with gusset plates.

Fracture critical files were checked for SFN 6241344. Files did contain the identification of the fracture critical member, fatigue prone details, and details of the procedure.

Gusset plate calculations were checked for SFN 6241344. The P.E. name and stamp were present and the unstiffened edge test was performed.

Underwater Inspections and Scour

There are not any bridges that require underwater inspections. There are 112 bridges considered scour susceptible and 61 bridges that are inspected by probing.

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. In addition, bridges are inspected by a different team member every year.

Inventory QA are performed during the inspection process yearly.

Critical Findings

The county does have a Critical Findings Procedure in place. The Ottawa County Bridge Engineer works directly with the County Engineer to address any immediate needs. The Maintenance Superintendent is included in the conversation to determine if the work will be done by force account or by contract. The county was advised to use the SMS Critical Findings Report.

Bridge Maintenance

The County has maintenance responsibilities for 113 bridges, 92 of which are greater than 20 feet in length and 21 between 10 feet and 20 feet in length. The County does force account bridge work as needed, with a materials budget of about $10,000 per year. Major maintenance, bridge rehabilitation, and bridge replacement is done by contract. Approximately $500,000 is budgeted for bridge capital improvement contract work annually.

The county uses in-house staff to do in-house repairs and replacements. The staff includes Bridge Foreman and a 2 to 4 man labor crew. Work performed on bridges include bridge cleaning, approach/embankment improvements, side drainage improvements, wearing surface patching/chip seal, and miscellaneous steel repairs. The approximate annual budget for in-house repairs and replacements is $10,000 materials and labor.

Projects are identified based on account maintenance and capital improvements. The plans for emergency repairs are developed in-house by the bridge engineer. Repair work is documented with plans, inspection records, material documentation, payroll. All information is placed in the permanent bridge file. In an emergency, the County Engineer by resolution through the Ottawa County Board of Commissioners is the one who orders road closures.

CONCLUSIONS AND RECOMMENDATIONS

- Many bridges had scour code Item 113 should be changed from 8 to 5. " stable and within footer limits and not above footer limits". Check all bridges in next round of inspections
- SFN 6238319
  - the Superstructure Arch item c27 should be coded 3, not 2. The Summary and General Appraisal would drop from 5 to 4.
- SFN 6230377
  - Approach Alignment Item 72 should be coded 8 not 6.
  - The abutment is a wall type, do not rate item c34 Abutment Caps
  - Deck item c7.1 Floor/Slab is coded 2. If the Summary is 4, the Floor/Slab must be coded a 3.
  - Channel Alignment should be 2 due to the flow along 1 abutment
- SFN 6230067
  - The Approach Alignment should be changed from 6 to 8.

The chart on the following page is a review of the 23 Metrics used to measure NBIS compliance and the chart represents a **preliminary**, **unofficial** assessment of the county's level of compliance. Action steps for compliance are listed at the bottom. The actual assessments of NBIS compliance are made by FHWA, based on documentation, and any final determinations of compliance may differ from this preliminary assessment. The Metric 12 & 22 result on the following page is based on the field review of the six bridges visited during the QAR using the NBIP Field Review Checklist - PY 2013, Minimum Level Review Items.

PRELIMINARY FHWA 23 Metric Matrix

23 metrics used by FHWA to measure NBIS compliance. Actual "score" by FHWA may differ.

Compliance Codes for the following Metrics:

(C)	Compliant
(SC)	Substantially Compliant
(CC)	Conditionally Compliant
(NC)	Not Compliant

Metric	**Description**	**(C)**	**(SC)**	**(CC)**	**(NC)**
1	State Bridge Inspection Organization				
2	Program Manager Qualification				
3	Team Leader Qualification				
4	Load Rating Engineer Qualification				
5	UW Bridge Inspection Diver Qualification				
6	Routine Inspection Frequency - Low Risk				
7	Routine Inspection Frequency - High Risk				
8	UW Inspection Frequency - Low Risk				
9	UW Inspection Frequency - High Risk				
10	FC Inspection Frequency				
11	Frequency Criteria				
12	Inspection Quality ** 100%				
13	Load Rating				
14	Posted or Restricted Bridges				
15	Bridge Files				
16	FC Bridges				
17	UW inspection procedures				
18	Scour Critical Bridges				
19	Complex Bridges				
20	QC/QA				
21	Critical Findings				
22	Inventory ** 97%				
23	Updating of Data				

** based on results of Field Review

Metric	Action Needed