National Bridge Inspection Standards & Bridge Maintenance Program Review
Erie County
May 30, 2019

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

IN ATTENDANCE:

Matt Rogers, P.E.
Mike Farrel, P.E.
Tim Lloyd, Deputy Engineer
Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Erie County personnel, reviews of inspection and inventory data, and reviews of Erie County bridge records. The office evaluation assessed Erie County's organization, procedures, resources, and documentation regarding the inspection, inventory, and maintenance operations for bridges. In addition, field reviews of six 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 Erie 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
2231743	ERI T1226 00.500	111	2008	16'	5A	same
2230607	ERI T0131 00.530	321	2005	69'	6A	same
2231379	ERI C0005 02.920	112	1967	80'	6A	same
2231204	ERI T0091 00.480	195	1975	23'	6A	same
2230984	ERI T0035 02.150	395	1938	19'	6A	same
2230895	ERI T0118 00.570	231	1963	26'	6A	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.

Erie County has inspection responsibilities for 138 bridges, 83 of which are longer than 20 feet in length and 55 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"). There were some minor issues in regards to complete compliance with the National Bridge Inspection Standards (NBIS). Comments are listed below.

Inspection Procedures

Erie 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. The county was reminded that ratings of 5 and below require complete comments describing Location, Extent, and Severity (LES), including pictures and/or sketches.

The County indicated that an average of 15 inspections per day were completed in 2018. The inspections include some smaller bridges between 10'-20' as well as NBIS length bridges. The County does not have any bridges that uses a snooper for inspection. The inspector uses photographs to document deficient bridge conditions, and photographs are available for every bridge.

During bridge inspection, maintenance problems are identified on the bridge inspection form. The maintenance personnel are informed of routine bridge maintenance by a written list. If an emergency repair or critical finding are necessary, the Highway Superintendent or Assistant Highway Superintendent are notified, within one week, using the Critical Findings Report.

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Erie 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. The Program Manager, while consulting the team leader, will determine if a bridge will need more than one

inspection yearly by observing the condition of the bridge in conjunction with the structure type, load rating, etc.

Qualification and Duties of Personnel

Mr. Jack Farschman is the Erie County Engineer. As such, he has the final authority over the bridge program in Erie county.

Mr. Matt Rogers is the Program Manager, Reviewer, Team Leader, and Load Rating Engineer. Mr. Rogers is a PE and has 15 years of inspection related experience. He took the Bridge Inspection Basic in 2001, the Bridge Inspection Level 2 in 2010, the Bridge Inspection manual Update in 2011, the SMS Training in 2013, and the Bridge Inspection Refresher in 2017.

Mr. Mike Farrel is a Team Leader. He is a PE with 8 years of inspection related experience. Mr. Farrel took the Bridge Inspection Level 1 and Level 2 in 2010, the Bridge Inspection Manual Update in 2011, the SMS Training in 2013, and the Bridge Inspection Refresher in 2017. He is qualified to be Team Leader.

Mr. Jeremy Blakely is a Team Member. He has 9 years of inspection related experience. Mr. Blakely took the Bridge Inspection Level 1 in 2008. He is qualified to be Team Member.

Inspection Reports

As part of this review, six bridges were field reviewed to compare conditions with the most recent inspection report. The individual condition ratings for all six bridges properly reflected the field conditions value when compared to the Manual. Summary ratings correspond with the NBIS inspection items. All discrepancies were discussed at the bridge site.

Inventory Items

There are 79 NBIS bridge plans available and 41 available for non-NBIS bridges.

During the Office review, the following issues were found in the bridge data:

- SFN 2230226 FC and UW inspection required Y/N items 92 A and 92B were not completed. The county indicated they willl be added at the next inspection.

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

- SFN 2231743

    - Scour code Item 113 was coded 8 (scour above footing or piling). The county should review the scour code since most bridges are better coded as 5 (within limits of footing or piling)
- SFN 2231379
    - Ohio Percent Legal should be changed from 150% to 85%.
    - Bridge roadway width from curb-to-curb should be changed from 31' to 36'.
- SFN 2230895
    - Item 51 Bridge roadway width curb-to-curb should be changed from 28' to 32'.
    - Item 52 Deck width out-to-out should be changed from 28' to 32'
    - Item 47 Inventory Route total horizontal clearance should be changed from 28' to 32'.

Files
Erie County maintains files at the county using the network server, SMS, and also physical folders (depending on the age of bridge/maintenance).

Load Rating
The inventory shows 83 (100.00%) of the County bridges have been Load Rated or Load Rating was not applicable. There were 2 bridges evaluated by documented engineering judgement. The County was also reminded that, during an inspection, any bridges that have the General Appraisal moved from a 5 to 4 will trigger a new load rating.

Load Ratings were checked for SFNs 2231816, 2231964, 2231352, and 2231379. The load posting at the bridge matched the load ratings. SFN 2231352 matched the posted load rating but was capped at 18 tons. SFN 2231379 posted an EV sign. PE name and stamp was on all the bridges. Erie county has road load weight limits, and when a bridge limit is higher than the road limit, they post the bridge at the road weight limit for consistency.

Load Posting
Erie County has 3 bridges that are load posted. This is determined typically by structural analysis. There are 0 bridges that closed for condition ratings. They use SHV signage. Posting is based on Operating Rating.

Special Features
Erie County has no bridge with special features.

Fracture Critical Bridges
Erie County has no FC bridges.

Underwater Inspections and Scour

There is 1 bridge that needs an underwater inspection. SFN 2230186 on Mason Rd over Huron River was had an Underwater Inspection in 2016. The bridge's file was reviewed and included procedure, location of underwater elements, and frequency identified. There are 0 bridges considered to be Scour Critical. Scour evaluations are done using the ODOT Scour Assessment forms. The County Engineer's Office also agrees to have a global scour statement and complete baseline photos and/or cross sections, as required. The county was advised if they had any potential scour issues, the written scour evaluation should be placed in the file. The Program Manager will determine the need for dive inspections based on the normal water depth and the ability to visually/tactile insect without diving.

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. In addition, the Reviewer rates a random selection of bridges, independently, without referring to the inspection team's data. The Reviewer then discusses the discrepancies with the Team Leader.

Inventory QA are performed using ODOT SMS error checking, comparison of data plan versus SMS data, and by reviewing the inventory data during input into SMS. The county was advised that the updated inventory data should be forwarded to ODOT at least once every 180 days.

Critical Findings

The county does have a Critical Findings Procedure in place. The county was reminded to use the Critical Findings Report that is in the SMS.

Bridge Maintenance

The County does force account bridge work as needed. They use a bridge crew of 3-4 people for this work. Work performed on bridges include structure replacement, superstructure replacement, concrete slab edge removal and replacement (longer spans), major guardrail/bridge rail repair and replacement, and wearing surface removal and replacement. Approximately $600,000 is budgeted for force account work annually. The County uses Fed Funds and Credit Bridge funds once every four years.

The county has a contract construction program that does in-house work. Work performed on bridges include beam replacement (1 or 2 beams on a structure), concrete slab edge removal and replacement (shorter spans), tree and brush removal, concrete sealing, steel deck replacement, re-waterproofing/drainage/drip strip, concrete patching, minor guardrail and railing repair, and sour repairs. The approximate annual budget is $25,000-$50,000.

Projects are identified by ODOT general appraisal, estimated project cost, and budget. Plans are developed for emergency repairs by the office staff. They converse with the highway superintendent and create plans for the repairs. Contracted work plans are developed in house. Emergency repairs are done by the bridge crew. All jobs are tracked by timecards and force accounts. The sketch plans, notes, and photos can also be referenced to track job

progress. The County Engineer, County Sheriff, Highway Superintendent, and Assistant Superintendent are empowered to order emergency road closures.

CONCLUSIONS AND RECOMMENDATIONS

- SFN 2230226 FC and UW inspection required Y/N items 92 A and 92B were not completed. The county indicated they willl be added at the next inspection.

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The chart on the following page is a review of the 23 Metrics used to measure NBIS compliance and the chart represents a **preliminary**, **tentative** 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 ** 96%				
23	Updating of Data				

** based on results of Field Review

Metric	Action Needed