

National Bridge Inspection Standards & Bridge Maintenance Program Review Wayne County May 30, 2018

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

IN ATTENDANCE:

Scott Miller
Eric Liew
Craig Wuthrich
Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Wayne County personnel, reviews of inspection and inventory data, and reviews of Wayne County bridge records. The office evaluation assessed Wayne 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 Wayne 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
8558051	WAY C0019 01.500	112	1972	94'	6A	same
8533970	WAY T0107 00.350	364	1965/1997	28'	5P	same
8545359	WAY M20000 00.270	231	1970	46'	5A	same
8546924	WAY T0041 00.770	34A	1959/1988	48'	7P	same
8546932	WAY T0041 00.780	34A	1959/1988	48'	7P	same
8550999	WAY T0107 00.460	321	1955	15'	5A	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. Wayne County has 0 bridges on the expanded NHS.

Wayne County has inspection responsibilities for 492 bridges, 261 of which are longer than 20 feet in length and 231 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 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

Wayne County uses a consultant John Wackerly to do the bridge inspections. The inspector brings last year's inspection to the bridge on paper and changes are put into the SMS in the office. Comments are recorded and brought to the bridge. Photos are available for every 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. Bridge plans are not carried to the bridge site but are available in the bridge office. Not all bridges has plans.

A county indicated that an average of 11 inspections per day were completed in 2017. The county was advised that FHWA recommends a maximum of 10 inspections per day although they acknowledge that working long days, or new or precast structures close together will shorten that time. The inspections include some smaller bridges between 10'-20' as well as NBIS length bridges. The inspection team believes they have enough time to do the job.

The County does not have any bridges that are required to use a snooper for inspection.

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. The SMS showed Wayne County had all bridges inspected in 2017. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. There are no bridges that require inspection more frequently than one year intervals.

Qualification and Duties of Personnel

Mr. Eric Liew is the Program Manager. He has 15 years inspection experience. He took the ODOT Level 1&2 courses in the 1990's. He took the ODOT Refresher on 04/12/2016. He is qualified as a Program Manager.

Mr. John Wackerly is the Reviewer and Team Leader. He is a PE and has 32 years bridge inspection experience. He is an instructor for NHI 2 week inspection course and NHI Fracture

Critical Member course in years 2002-2012. He is qualified to be a Team Leader and Reviewer.

Mr. Craig Wuthrich is a Team Member. He has 1 year bridge inspection experience in 2018 and no training.

Eric Liew, PE #57459 did the load ratings. He is qualified to do load ratings.

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 within the tolerance of 1 rating value when compared to the Manual. Summary ratings correspond with the NBIS inspection items. All discrepancies were discussed at the bridge site.

Inventory Items

During the Office Review, no inventory problems were found. However, there was 1 Dive inspection that was missing Item 92B (Dive insp required Y/N). That items will be completed at the next routine inspection.

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

- SFN 8546932, 8546924, Approach Roadway Alignment Item 72 should be 8, not 5.
- SFN 8545359 Approach Roadway Width Item 32 should be 24' not 54.
- SFN 8545359 Approach Roadway Width Item 32 should be 26' not 36.
- SFN 8550999 Scour Code Item 113 should be 5 not 8.
- SFN 8533970 Scour Code Item 113 should be 5 not 8. Approach Roadway Alignment Item 72 should be 8 not 6.

Files

Wayne County maintains Bridge files mostly in filing cabinets. The Bridge files contain plans, load analysis calculations, inventory forms, repair history, FC Plans, Load Posting/Closing documents, and flood/hydraulic data. New inspection reports are in the SMS and the old inspection reports are kept in the filing cabinet. Photos and sketches are kept in the computer under "Photolog" folder Repairs and Maintenance history are kept in the computer under "Bridge Repair History" folder.

Load Rating

The inventory shows 257 (100.0%) of the County bridges have been Load Rated or evaluated by Engineering Judgment. 1 was evaluated by documented engineering judgement. The county already had a BR-100 for all bridges rated by engineering judgment. The County was also reminded that any bridges with the General Appraisal moving from a 5 to 4 triggers a new load rating.

Load Ratings were checked for SFN 8534012, 8535906, 8537526, 8534160. The load posting at the bridge matched the load ratings. PE name and stamp were on all load ratings.

Load Posting

Wayne County has 39 bridges that are load posted. This is determined by analysis and engineering judgement. There are no bridges closed due to condition rating. They use the new SHV signs for posting and Operating Rating to determine the posting limits.

Special Features

The County has no bridge with special features.

Fracture Critical Bridges

Wayne County has 40 bridges labeled as a fracture critical bridge in the SMS. 15 have gusset plates.

FC Files were checked for SFN 8546924 and SFN 8546932. FC files did contain the identification of the FC Members. The files also contained the FC Inspection Procedures as well as the Fatigue Prone details.

There are 15 NBIS bridges with Gusset Plates. SFN 8532281 was reviewed. It had the PE name and stamp and also the unstiffened edge test..

Underwater Inspections and Scour

0 bridges need an underwater inspection. There are no bridges that are considered to be Scour Critical. There are 490 bridges inspected by probing. The county was advised if they had any potential scour issues, a written scour evaluation should be placed in the file.

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. In addition the Team Leaders are rotated on the bridges to provide a fresh viewpoint.

Critical Findings

The county does have a Critical Findings Procedure in place, as well as Critical Findings Documentation.

Bridge Maintenance

The County does force account bridge work as needed. They use a bridge crew of 3-4 workers to do bridge work. Work performed on bridges includes box culverts, steel beams, and corrugated decks. Approximately \$375,000 is budgeted for force account work annually.

The county has a contract construction program that does box culverts. The approximate annual bridge funding budget is \$200,000. The County does not use federal funds and credit bridge funds.

Plans for emergency projects are done in-house. The work for emergency repairs is done in-house also. Repair work is documented by a yearly force account summary sheet. Scott Miller and Eric Liew are empowered to order road closures.

CONCLUSIONS AND RECOMMENDATIONS

- 1. SFN 8546932, 8546924, Approach Roadway Alignment Item 72 should be 8, not 5.
 - SFN 8545359 Approach Roadway Width Item 32 should be 24' not 54.
 - SFN 8545359 Approach Roadway Width Item 32 should be 26' not 36.
 - SFN 8550999 Scour Code Item 113 should be 5 not 8.
 - SFN 8533970 Scour Code Item 113 should be 5 not 8. Approach Roadway Allignment Item 72 should be 8 not 6.
2. there was 1 Dive inspection that was missing Item 92B (Dive insp required Y/N). That items will be completed at the next routine inspection.
3. The county was reminded that ratings of below 6 require complete comments describing Location, Extent, and Severity (LES), including pictures and/or sketches. The county should use more dimensions and quantities in the comments.

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 ** 95%				
23	Updating of Data				

** based on results of Field Review

Metric	Action Needed