

National Bridge Inspection Standards & Bridge Maintenance Program Review Huron County June 12, 2018

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

IN ATTENDANCE:

John Wackerly, Wackerly Inspection LLC
Lee Tansey, Huron County Engineer
Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Huron County personnel, reviews of inspection and inventory data, and reviews of Huron County bridge records. The office evaluation assessed Huron 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 Huron County to represent a variety of structure types and conditions. The bridges checked during the field review were:

<u>SFN</u>	<u>CTY-RTE-SECT</u>	<u>TYPE</u>	<u>YEAR BUILT /REHAB</u>	<u>OVERALL LENGTH</u>	<u>County RATING</u>	<u>Suggested NBIS RATING</u>
3930890	HUR T0027 00.890	321	1952	44'	4P	same
3936473	HUR T0065 00.610	111	1900	17'	5A	same
3937178	HUR C0114 04.840	555	1890	16'	3P	same
3942155	HUR C0150 02.950	121	1984	27'	4A	same
3937623	HUR C0052 01.430	321	1934	37'	5P	same
3930610	HUR C0040 00.150	344	1944	132'	6P	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. Huron County has 0 bridges on the expanded NHS.

Huron County has inspection responsibilities for 406 bridges, 222 of which are longer than 20 feet in length and 184 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 8 bridges had the Item 306 NBIS length greater than the span Item 48. The NBIS designation Y/N could possibly be coded incorrectly on 3 of those since the value was so close to 20'. The county will need to check those 8 bridges for proper coding in Item 306 NBIS Length.

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

Huron County uses a consultant to do the bridge 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 a separate paper and in the SMS. The comments are fairly complete but could use more details in quantity/extent and severity. 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 12 inspections per day were completed in 2017. 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.

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Huron County had all 406 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 currently no bridges that require inspection more frequently than one year.

Qualification and Duties of Personnel

Lee Tansey is the Huron County Engineer and as such is ultimately responsible for all aspects of the bridge program.

Mr. John Wackerly is the Program Manager, Reviewer, and Team Leader. He is a PE registered in Ohio and is currently an instructor for the NHI Bridge Safety. He is qualified to be the Program Manager, Reviewer, and Team Leader.

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, the following problems were found.

- The Underwater Inspection Switch Y/N in Item 92B on the Review page was not entered for 8 bridges. Also the Fracture Critical Inspection Switch Y/N in Item 92A on the Review page is missing. The county inspector will enter the Y/N switch at the next routine inspection.
- 13 bridges had incorrect entries in the load rating page, errors as follows:
 - Item 724 should be filled in with "5C1", not the GVW "27"
 - Item 727 should be filled in with "SU5", not the GVW "31"
 - Item 730 should be filled in with "SU6" or "SU7", not the GVW "34.75"

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

- SFN 3930890, 3942155, 3837623 and 3936473 Scour Code item 113 should be code 5, not 8 or 9.
- SFN 3937178, 3930610 and 3942155 Abutment Type Item 526 should be Solid Wall code 3, not code A Proprietary. The Proprietary section is the wingwall, not the abutment.
- SFN 3937623 Guardrail safety items 36A, B, C should be code 1, not 0.

Files

Huron County maintains Bridge files in folders in a filing cabinet. Photos are stored on the computer.

Load Rating

The inventory shows 222(100.0%) of the County bridges have been Load Rated or Load Rating was not applicable. 10 were evaluated by documented engineering judgement. 0 did not have vehicular traffic and did not need load rated. 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 SFNs 3937623, 3935116, 3932622, 3942155. The load posting at the bridge matched the load ratings except for SFN 3937623. SFN 3937623 was posted at 15 tons but was rated for 18 tons. This is acceptable to the county. PE name and stamp was on all the bridges.

Load Posting

Huron County has 2 bridges that are load posted. This is determined typically by analysis. 0 bridges are closed for condition ratings. They use a gross tonnage sign for load posting. They will use SHV signs after the Group B bridges are rated.

Special Features

The County has no bridge with special features.

Fracture Critical Bridges

Huron County has 29 bridges labeled as a fracture critical bridge in the SMS. 28 have gusset plates.

FC bridges SFNs 3941582 and 3930610 files were checked. They did include the FCM's and the Fatigue Prone details were shown. They need to add risk factors to the detailed procedure.

Gusset Plate calculations were checked for SFNs 8833931 and 3941582. They both contained a PE stamp and the Unstiffened Edge length test.

Underwater Inspections and Scour

0 bridges need an underwater inspection. There are 0 bridges considered to be Scour Critical. 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.

Critical Findings

The county did have a Critical Findings Procedure in place. Critical Findings documentation was explained.

Bridge Maintenance

The County does force account bridge work as needed. They use a crew of 4 bridge workers. Work performed on bridges include new box structures and plating holes in stringers.. Approximately \$200,000 is budgeted for force account work annually.

The county has a contract construction program that replaces structures with new or does rehab work. The approximate annual budget varies from \$0 - \$300,000. The County uses Fed Funds and Credit Bridge funds.

Projects are identified and prioritized by condition. Plans are developed in house for work performed by county forces. Contracted work plans are also developed in house. Emergency repairs is done by county forces. All jobs are tracked by daily crew worksheets.

CONCLUSIONS AND RECOMMENDATIONS

1. The following inventory errors should be addressed:

- The Underwater Inspection Switch Y/N in Item 92B on the Review page was not entered for 8 bridges. Also the Fracture Critical Inspection Switch Y/N in Item 92A on the Review page is missing. The county inspector will enter the Y/N switch at the next routine inspection.
- 13 bridges had incorrect entries in the load rating page, errors as follows:
 - Item 724 should be filled in with "5C1", not the GVW "27"
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- SFN 3937623 Guardrail safety items 36A, B, C should be code 1, not 0.

2. The county was advised that any bridges with potential scour issues should have a written scour evaluation.

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 be more consistent using details and quantities in the comments.
4. The FC files did not contain risk factors peculiar to each bridge
5. 8 bridges had the Item 306 NBIS length greater than the span Item 48. The NBIS designation Y/N could possibly be coded incorrectly on 3 of those since the value was so close to 20'. The county will need to check those 8 bridges for proper coding in Item 306 NBIS Length.
6. The comments are fairly compete but could use more details in quantity/extent and severity.

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

<u>Metric</u>	<u>Action Needed</u>