

National Bridge Inspection Standards & Bridge Maintenance Program Review

Ashland County

September 28, 2020

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

IN ATTENDANCE:

Guy Keener

Ryan Athy

Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Ashland County personnel, reviews of inspection and inventory data, and reviews of Ashland County bridge records. The office evaluation assessed Ashland 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 checked during the field review were:

SFN	CTY-RTE-SECT	TYPE	County Rating	Suggested NBIS Rating
0331244	ASD M003A 2993	Concrete Culvert	4A	same
0334081	ASD C0175 1960	Steel Girder	5A	same
0336165	ASD C0075 2080	Steel Culvert	4A	same
0334162	ASD C1610 1613	Concrete Slab	4A	same
0334065	ASD C1575 1520	Steel Beam	4A	same
0331961	ASD C1100 0060	Pres Box Beam	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/fapag/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.

Ashland County has inspection responsibilities for 222 bridges, 136 of which are longer than 20 feet in length and 86 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

Ashland County uses their own staff to do the inspections. Previous inspection reports are available at site for review. Copies of last year's inspections are taken to the field and marked up with new ratings and comments. They are then taken back to the office. Comments are recorded in the notes section in SMS or sheets in each bridge folder. They are brought to the bridge. Bridge plans are not carried to the bridge site for review. Bridge plans are available on file at the Bridge Office. Photos are available for every bridge, and photos are taken of defects during inspection.

The County indicated that an average of 15 inspections per day were completed in 2020. Truss (pony/through/deck) takes 0.66 hours. It takes 0.33 hours for Beam/Girders. For a slab, it takes about 0.25 hours. For a Culvert, it takes about 0.16 hours.

The County does not have any bridges that require a snooper for inspection.

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Ashland County had 233 bridges inspected in 2020. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. The Engineer determines the need for a routine inspection frequency greater than once a year. There are not any bridges that requires inspection more frequently than one year.

Qualification and Duties of Personnel

Mr. Edward Meixner is the County Engineer and Program Manager. He has 20 years of inspection related experience. He has submitted the Legacy Grandfather Clause checklist to show his experience. The comprehensive training requirement will have been met when it is

approved. He took a Bridge Inspection Refresher in 2021. The Refresher certificate is upload to AssetWise and is compliant with the Metric Requirement.

Mr. Ryan Athy is the Reviewer. He is a PE and has 9 years of inspection related experience. He took thr Level 1 and Level 2 in 2011. The Comprehensive certificate is upload to AssetWise and is compliant with the Metric Requirement. He took a Bridge Inspection Refresher in 2016. The Refresher certificate is upload to AssetWise and is compliant with the Metric Requirement.

Mr. Guy Keener is the Team Leader. He has had 18 years of inspection related experience and 14 years of bridge construction experience. He took the Level 1 and Level 2 class in 2018. The Comprehensive certificate is upload to AssetWise and is compliant with the Metric Requirement. He took a Bridge Inspection Refresher in 2020. The Refresher certificate is upload to AssetWise and is compliant with the Metric Requirement.

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 when compared to the Manual. Summary ratings correspond with the NBIS inspection items.

Inventory Items

During the Files review, there were not any inventory items found to be in error.

Files

Ashland County keeps all information and documents as follows. Inspection reports, including old inspections, are kept in a binder in the office and stored in the basement. Design Calculations, Plans, Load Analysis Calculations, Scour Evaluations, Fracture Critical Files, and Load Posting/Closing are all kept in a bridge file in the office. Plans are also kept electronically and basement storage. Photos and sketches are kept on the computer server.

Load Rating

The inventory shows 222 (100.00%) of the County bridges have been Load Rated or Load Rating was not applicable. There were 0 bridges evaluated by documented engineering judgement.

Load Ratings were checked for SFNs 0334510, 0334537, and 0333530. The load posting at the bridge matched the load rating on all bridges. P.E. name and stamp were on all of the bridges. Documentation was on all of the bridges.

Load Posting

Ashland County has 0 bridges that are recommended for posting. There are no bridges closed for condition ratings. They use a mix of engineering judgment and analysis. The large load limit sign R12-H5 is the type of sign used for load posting.

Special Features

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

Fracture Critical Bridges

The FC bridge inspection frequency is 24 months but they do the FC inspections yearly to be sure the frequency is met. Ashland County had SFN 0330108 and SFN 0334510 reviewed. They both had FCM's identified. They both did not show the Fatigue Prone details and the procedure was only partially detailed. Risk Factors are incomplete, and they need personnel requirements. Risk factors are listed in the Metric 16 and include low temp, load limits, rating 4 or less listed when it applies to that bridge. There also needs to be better description of inspection methods. Gusset Plate calculations were good.

Underwater Inspections and Scour

There are 0 bridges require underwater inspections. There are 222 bridges over waterways considered scour susceptible and the 30 bridges inspected by probing. There are 0 bridges that are scour critical.

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. Quality Assurance checks are performed by updating the inventory as changes are made in bridge status or as they are found. Inventory is looked over as needed. Updated inventory data needs to be forwarded to ODOT within 180 days. The inventory data is updated through Asset Wise. Changes are discovered during inspection when new inspection is being input. It is then forwarded to ODOT immediately during inspection and on new construction, as soon as the project is complete or the bridge is ready to open.

Critical Findings

The county does have a Critical Findings Procedure in place located in the AssetWise. Maintenance problems are identified on the bridge inspection form. Inspectors inform maintenance personnel of routine bridge maintenance problems in house on work order forms. When emergency repairs or critical findings are necessary, the inspectors notify the Engineer and Road Superintendent. The emergency action is documented in house on a work order form and inspection form. If a bridge requires emergency repairs, it would be noted on the field inspection comments and work order. Inspectors verify correct limits are on signs and bridges.

Bridge Maintenance

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 County does force account bridge work as needed. The work includes complete bridge replacement and major rehab. The approximate budget is \$300,000. Fed Funds and Credit Bridge Funds are used.

The county uses in-house staff that consists of 2-4 staffing, as needed for the job. Typical work items include steel beam repair, steel structure rehab, and concrete beam replacement. The approximate budget is \$200,000.

Projects are identified and selected based on inspections and load rating. The inspector or road superintendent identify problems and close roads if required. The engineer is then notified to determine the severity if needed and determines the most effective repair or replacement plan. County forces are the ones who do the emergency repairs for most repairs. The contractor helps if needed. Repair work is documented on time sheets and work order forms. When there are emergency road closures, the inspector, road superintendent, and engineer are empowered to order emergency road closures. The person who finds the problem waits at the site to stop traffic from crossing until the county crews can bring barricades to close the road.

CONCLUSIONS AND RECOMMENDATIONS

- SFN 0331244
 - Photos – No photos for showing defect of culvert. These are required to be in the bridge file
 - Comments have a lot of locations, but no E and S (need qty and measurements and % area, etc.)
- SFN 0334081
 - Photos – No photos for showing defects for the superstructure. These are required to be in the bridge file
- SFN 0336165
 - Photos – No photos for showing defect of culvert. These are required to be in the bridge file
 - Comments are not specific, “flattening, sag, rusty, slightly cusping”... describe how much and LES (Location Extent and Severity)
 - Channel Photos – Incorrect channel photos. They need to be in channel looking at the bridge, not on the road looking down
- SFN 0334162
 - Add some quantities to the superstructure and substructure comments, such as 50% area is spalled widespread on top, 25% pf floor showing rebar, probe under abutment 6”
- SFN 0334065
 - Scour – 7 rating should be a 5, Substructure is already a 4 so that it won’t change due to scour
 - Comments have a lot of locations, but no E and S (need qty and measurements and % area, etc.)
 - Photos – Shows piling problems. Does not show the problem with the Super or Deck. By ODOT policy last month they need to be in the bridge file
- SFN 0331961
 - Photos – No photos of Substructure problems – need to put them in the bridge file

- Channel Photos – Incorrect channel photos. They need to be in channel looking at the bridge, not on the road looking down
- Need better LES on superstructure comments
- FC Plans need to be improved – see discussion in this report

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 (CC) Conditionally Compliant (per approved PCA)
 (SC) Substantially 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				
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 **				

23	Updating of Data
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** based on results of Field Review

Metric	Action Needed
12	Scour Rating should control Substructure or Culvert
16	Supply FC Insp Procedure and Fatigue Prone Details for each FC bridge