

**National Bridge Inspection Standards &
 Bridge Maintenance Program Review
 Athens County
 September 25, 2019**

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

IN ATTENDANCE:

Donnie Stevens
 Brandon Williams
 Jeff Maiden
 John Brunton
 John Wackerly
 Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Athens County personnel, reviews of inspection and inventory data, and reviews of Athens County bridge records. The office evaluation assessed Athens 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 Athens 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
0544264	ATH C0027 00.250	34A	1967	106'	5P	same
0534978	ATH C027 01.260	111	1949	19'	7A	same
0540919	ATH T0315 00.010	364	1975	65'	4P	same
0541044	ATH T0347 00.100	444	1876	78'	4P	5P
0540986	ATH C031C 03.200	321	1930	20'	5P	same
0535028	ATH C0027 03.540	321	1939	14'	3P	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.

Athens County has inspection responsibilities for 335 bridges, 155 of which are longer than 20 feet in length and 180 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 1 bridge (054100) had the NBIS designation Y/N possibly coded incorrectly. The county needs to check the f-f abutment distance and make corrections to item 48 or 306.

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

Athens County uses their own staff to do the inspections. Previous inspection reports are available at site for review. The inspections are marked on paper copy then entered into SMS in the office. Comments are recorded on a separate comments form that goes with each inspection form. Bridge comments are brought to the bridge. Photos are available for every bridge. Bridge plans are not taken to the bridge site.

The County indicated that an average of 12 inspections per day were completed in 2018 depending on the location and type of bridge, and type of inspection. For Truss (pony/through/deck) it takes about 3 hours. It takes 50 minutes for Beam/Girders. For a slab, it takes 40 minutes. For a Culvert, it takes 30 minutes.

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. Athens County had 400 bridges inspected in 2018. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. Fracture Critical inspections are performed every 24 hours. There are 0 bridges that require inspection more frequently than one year. Bridge inspection frequency is determined by the Program Manager based on inspection report.

Qualification and Duties of Personnel

Mr. Jeff Maiden is the County Engineer and as such he has final authority over the bridge program.

Mr. Donnie Stevens is the Program Manager. Mr. Stevens is a PE and has 2 years of inspection related experience. He took Level 1 Training on 08/30/2018 and Level 2 on 09/27/2018. He took an Inspection Refresher in 2019. Mr. Stevens is qualified as Program Reviewer.

Mr. John Wackerly is the Team Leader. Mr. Wackerly has had 33 years of inspection related experience. He received his BSCE from Akron University in 1986 and is a registered PE in Ohio. Mr. Wackerly is qualified to be the Team Leader.

Mr. John Brunton is a Team Leader. He has 9 years of inspection experience. He took the ODOT Bridge Inspection Level 1 in 2011, Level 2 in 2011, and Level 2 Advanced in 2011 also. He took a Bridge Refresher Course in 2017. He is qualified to be a Team Leader.

Mr. Brandon Williams, is a Team Member. He has 2 years of design and inspection experience. He took Level 1 and Level 2 Bridge Inspection Courses in 2018. He is qualified to be a 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 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 0534978
 - Item 475 Main Member is coded Segmental Box Girder, but it should be Slab
 - Channel alignment should be coded 2
- SFN 0535028
 - The comments should be improved to show quantities and measurements.
 - Scour code Item 113 =4, action required, but scour mitigation has been done, so update the scour code to reflect the repairs
- SFN 0540919
 - Walk type abutments on this bridge do not have a cap, so do not code Abutment item c34 Abutment Caps
 - Item 407 Guardrail Type should be steel beam, not Post and Steel Panel
- SFN 0541044
 - The superstructure and general appraisal could be coded 5 instead of 4
 - Comments need to include quantities and measurements
 - Item 409 Deck Drainage should be corrected to show No Drip Strip

- Scour code item 113 is coded 4, action needed, but should be coded 5
- SFN 0540986
 - Structure Type should be concrete slab 111, not steel beam 321
 - Approach Alignment item 72 should be code 8, not code 6
 - Item 475 Main Member should be Concrete Slab, not Riveted Built up Steel

Files

Athens County maintains Inspection reports in paper files. Plans are on computer in plan files in the pole barn. Load calculations are on computer and paper. Repair history is in force account files. Photos are on computer. FC files are in the load rating notebooks and in the inspection file. Load Postings are in the inventory.

Load Rating

The inventory shows 155 (100.00%) of the County bridges have been Load Rated or Load Rating was not applicable. There were 37 bridges evaluated by documented engineering judgement.

Load Ratings were checked for SFNs 0548847, 0547905, 0541532, 0535095. The load posting at the bridge matched the load rating on two bridges, but did NOT match for SFN 0548847 (Posted 15, LR=7) and SFN 0541532 (Posted 15, LR=21). P.E. name and stamp were on all load ratings. The county decided for 0548847, where the load rating showed 7 tons and posted at 15, to change the load rating to Engineering judgment and keep 15 tons. For 0535095, the load rating showed 21 tons but it is posted at 15 tons. The county will raise the posted load limit to 21 tons.

The county needs to do a BR100 for all bridges that have engineering judgment as their Method of Rating.

Load Posting

Athens County has 37 bridges that are load posted and 1 closed. This is determined by analysis and engineering judgment. They use gross tonnage signage in the past but have been switching to the SHV signs. Posting is based on Operating Rating.

Special Features

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

Fracture Critical Bridges

Athens County has 4 bridges labeled as a fracture critical bridges in the SMS. There are 4 bridges with gusset plates.

Underwater Inspections and Scour

There are not any bridges that require underwater inspections.

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. All fracture critical inspections are done and reviewed during inspection. Every 3 years the inventory is checked for needed updates. The inventory data is entered into SMS in the office and data is taken from plans and load rating summary.

Critical Findings

The county does have a Critical Findings Procedure in place. If a bridge requires emergency repairs it is documented by phone then followed up with an email and put into the Critical Findings form in SMS. If a bridge requires emergency repairs, it is noted on the inspection report. The Bridge Inspector Team Lead is the one who checks proper placement of signs.

Bridge Maintenance

The County has a crew of 5 to do bridge work. Work performed on bridges includes repair of guardrail, scour protection and decking.

The county has a contract construction program. The county does use federal funds for replacements, but they will also use the credit bridge (soft match) program.

Plans for emergency projects are done by the inspector and the work is done by contractors. Projects are selected by inspection conditions. Labor, equipment and materials are all documented.

CONCLUSIONS AND RECOMMENDATIONS

- SFN 0534978
 - Item 475 Main Member is coded Segmental Box Girder, but it should be Slab
 - Channel alignment should be coded 2
- SFN 0535028
 - The comments should be improved to show quantities and measurements.
 - Scour code Item 113 =4, action required, but scour mitigation has been done, so update the scour code to reflect the repairs
- SFN 0540919
 - Walk type abutments on this bridge do not have a cap, so do not code Abutment item c34 Abutment Caps
 - Item 407 Guardrail Type should be steel beam, not Post and Steel Panel
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 - The superstructure and general appraisal could be coded 5 instead of 4
 - Comments need to include quantities and measurements
 - Item 409 Deck Drainage should be corrected to show No Drip Strip
 - Scour code item 113 is coded 4, action needed, but should be coded 5
- SFN 0540986
 - Structure Type should be concrete slab 111, not steel beam 321
 - Approach Alignment item 72 should be code 8, not code 6
 - Item 475 Main Member should be Concrete Slab, not Riveted Built up Steel

- The county needs to check for (and do if needed) a BR100 for all bridges that have engineering judgment as their Method of Rating.
- (054100) had the NBIS designation Y/N possibly coded incorrectly. The county needs to check the f-f abutment distance and make corrections to item 48 or 306.
- Overall, when the General Appraisal is 5 or lower, the comments need to include complete detailed descriptions, including photos or sketches. Complete detailed descriptions need to include quantities and measurements describing Location, Extent and Severity (LES)
- For the 37 bridges that are Posted, the county needs to check that the sign matches the load rating, and if not, make corrections.

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 **				
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				

** based on results of Field Review

Metric	Action Needed
12	Improve comments with quantities and measurements
22	Check inventory items for accuracy, suggest to use BM-191 form in field