

**National Bridge Inspection Standards &
 Bridge Maintenance Program Review
 Fulton County
 May 13, 2013**

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

IN ATTENDANCE:

Frank Onweller, County Engineer
 Benjamin C. Rowland, Bridge Engineer
 Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Fulton County personnel, reviews of inspection and inventory data, and reviews of Fulton County bridge records. The office evaluation assessed Fulton County's organization, procedures, resources, and documentation regarding the inspection, inventory, and maintenance operations for bridges. In addition, field reviews of eight 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 Fulton 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
2634082	FUL C18N0-0080	395	1965	49'	6A	same
2634821	FUL C23R0-0020	112	1958	73'	6A	same
2635119	FUL T25D0-0080	195	1957	13'	6A	same
2635070	FUL T25D0-0020	111	1923	24'	4P	same
2635224	FUL T26D0-0050	121	1946	32'	4A	same
2630893	FUL CG240-0060	322	1971	164'	6A	same
2634643	FUL T2220-2020	231	1994	27'	6A	same
2634155	FUL C1920-0A10	321	1900/88	40'	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 NHS system beginning in 2015.

Fulton County has inspection responsibilities for 260 bridges, 120 of which are longer than 20 feet in length and 140 which are 10 feet to 20 feet long. Fulton County records showed 259 because 1 bridge in the BMS was in the Village of Swanton. The county issued Swanton a letter in 2009 that they were not going to inspect their bridge but last year the consultant switched it back to the county. ODOT and the CEAO federal Bridge Engineer agree it should be a Village bridge and ODOT was notified to change the records. The NBIS inspection and load rating requirements only pertain to highway bridges in excess of 20' long on public roads. Review of the BMS span lengths showed possibly 5 bridges had an error in the span length. The county should review the measurements and correct the NBIS coding if necessary.

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"), but there are some minor exceptions to complete compliance with the National Bridge Inspection Standards (NBIS) listed below. The County was aware of the timetable of the CEAO Statewide NBIS Plan to obtain complete compliance and are actively working to meet the October 1, 2013 deadline.

Inspection Procedures

Fulton County uses their own staff to do the inspections. The inspector brings a laptop to the bridge and a paper copy of last year's BR-86 and enters the new ratings in the CEAO program on the laptop while at the bridge site. Comments are recorded on paper while at the bridge and entered into the CEAO program. Comments from the prior year are brought to the bridge. The county was advised that ratings of 5 or lower require complete comments describing Location, Extent, and Severity, including pictures or sketches. Fulton County inspection personnel are inspecting bridges in compliance with the Manual and the NBIS. The ratings properly reflected the field conditions when compared to the Manual. A review of the BMS inspection records indicated that an average of 8.9 inspections per day were completed in 2012 and the highest number was 13 inspections per day. The inspections include some smaller bridges between 10'-20' as well as NBIS length bridges. Any number of inspections per day of 10 or less is preferred. The county was advised that their number of bridges inspected per day was high, and although not a violation of NBIS, it would invite deeper scrutiny from FHWA on the quality of the inspections.

The County does not need snoopers for bridge inspections. The inspector does use 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. Fulton County was current on all annual inspections. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. One bridge (SFN 2635224) inspected twice per year because of the T-Beam deterioration. A new inspection report is not filed.

Qualification and Duties of Personnel

Mr. Frank Onweller is the County Engineer and as such has overall responsibility for the bridge program.

Mr. Benjamin Rowland serves as the Program Manager, Reviewer and Team Leader. He is a PE and has over 5 years inspection experience. He took the ODOT comprehensive bridge inspection course in 2011. He has taken a Refresher Training, the SMS class in 2013. He is qualified to be a Program Manager, Reviewer and Team Leader.

Inspection Reports

As part of this review, eight bridges were field reviewed to compare conditions with the most recent BR-86. The General Appraisals for all bridges matched the Manual. Summary items correspond with the NBIS inspection items. There were only 2 differences of 1 rating value in the Summaries. All discrepancies were discussed at the bridge site.

Inventory Items

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

- 7 bridges (2634155, 2635224, 2635070, 2635119, 2634821, 2634082 and 2634643) had errors in the Approach Alignment, Item 89.
- 1 bridge (2634155) had an error in the overall structure length.
- 1 bridge (2634643) had an error in the Approach Roadway width
- 2 bridges (2635224 and 2635070) had an error in the Deck width
- 1 bridge (2635070) had an error in the Scour coding. It should be a 5, not 8.

During the Office portion of the review, additional inventory items in the BMS were checked and the following inventory issues were found:

- SFN 2632691, 2633620, and 2633256 are culverts that are coded NBIS=Y. The county should double check the measurements to be sure the requirements for NBIS are met.

Also during the review of the BMS data, 2 bridges (1.7%) showed the General Appraisal did not match the lowest of the Superstructure, Substructure, or Culvert Summaries. This should be corrected in future inspections. However, 1-4 codes correlating to 0-9 codes was very good, finding only 14 (0.7%) instances of inconsistency, but this could be correct in certain occasions (usually less than 1%). If deviations are necessary, then the inspection comments should explain why.

Files

Fulton County maintains Inspection reports on computer and in the bridge filing cabinet. Design calculations and plans are kept electronically and in the records vault. Load calculations and inventory forms are kept electronically and in the bridge filing cabinet. Photos are kept electronically. Repair history, Fracture Critical files, Load postings, and flood /waterway data are kept electronically and in the bridge filing cabinet. Scour evaluation and POA's are kept in the bridge filing cabinet.

Bridge load rating files for SFN 2634465, 2630532, and 2631984 were checked and found satisfactory, including the PE name and stamp of the load rating engineer. Section loss is accounted for in the calculations.

FC files and Gusset plate calculations were examined for SFN's 2631008 and 2632012. FCM's were identified, Fatigue Prone details (FPD) were shown and FC Inspection procedures were done. The unstiffened edge length test was done on the Gusset plate calculations.

Load Rating

The inventory shows 105 (87.5%) of the County bridges have been load analyzed or counted as good 5's. A cover letter by the County Engineer was provided to cover the load ratings done by county staff. 15 bridges remain to be load rated. They are under contract to be finished by August 1, 2013. The county will complete the load analysis of all bridges by Oct 1, 2013 as established within the ODOT CEAO bridge inspection agreement.

Load Posting

The BMS showed Fulton County has 5 bridges that are load posted for capacity and 0 posted for other reasons. 0 bridges are closed. There were no errors in the postings when comparing the posted restrictions to the calculations.

Special Features

The County has no bridges with special features.

Fracture Critical Bridges

Fulton County has 2 fracture critical bridges, 1 has Gusset Plates. Inspection Procedures and Fatigue Prone Details are done for each FC bridge.

Underwater Inspections and Scour

0 bridges require underwater inspections. All bridges were evaluated for Scour.

QA/QC

The county does have an internal QA/QC procedure, partnering with Wood County.

Critical Findings

The county does have a Critical Findings procedure. It is modeled after the ODOT model Flowchart.

Bridge Maintenance

The County has a county crew of 2-3 to do bridge work. Work performed on bridges includes deck cleaning, waterproofing, patching, and channel work, totaling about \$15,000 - \$20,000 per year.

The county has a contract construction program that does replacements, totaling about \$300,000 - \$900,000 per year. The county does not normally use federal funds for replacements, but they plan to in the future, having 1 project programmed for 2017. Credit bridge will also be used in 2017.

Plans for emergency projects are done by the county, and the work is done by county forces depending on the complexity. Projects are selected by inspection condition ratings. Labor, equipment and materials are all documented.

CONCLUSIONS AND RECOMMENDATIONS

1. The following inventory errors should be corrected.
 - 7 bridges (2634155, 2635224, 2635070, 2635119, 2634821, 2634082 and 2634643) had errors in the Approach Alignment, Item 89.
 - 1 bridge (2634155) had an error in the overall structure length.
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 - SFN 2632691, 2633620, and 2633256 are culverts that are coded NBIS=Y. The county should double check the measurements to be sure the requirements for NBIS are met.
2. During the review of the BMS data, 2 bridges (1.7%) showed the General Appraisal did not match the lowest of the Superstructure, Substructure, or Culvert Summaries. This should be

corrected in future inspections. However, 1-4 codes correlating to 0-9 codes was very good, finding only 14 (0.7%) instances of inconsistency, but this could be correct in certain occasions (usually less than 1%). If deviations are necessary, then the inspection comments should explain why.

3. possibly 5 bridges had an error in the span length. The county should review the measurements and correct the NBIS coding if necessary.

4. The number of inspections per day was high. The county was cautioned that, while not an error, this could invite greater scrutiny from FHWA.

5. Comments were not as complete as FHWA wants. The county was advised to increase the use of comments for the future inspections, including complete Location, Extent and Severity with pictures or sketches for ratings 5 or lower. Ratings above that can have nominal 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 results on the following page is based on the field review of the eight 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

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 94%				
23	Updating of Data				

** based on results of Field Review

<u>Metric</u>	<u>Action Needed</u>
13	Complete and submit load ratings by Oct 1, 2013
22	check inventory and make corrections in upcoming year