National Bridge Inspection Standards & Bridge Maintenance Program Review
Clinton County
October 16, 2013

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

IN ATTENDANCE:

Jeff Linkous, Clinton County Engineer
Adam Fricke, Deputy Engineer
Tom Hodson, Assistant Engineer
Gary Smith, Engineering Assistant
Bill Temple, Assistant Engineer
Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Clinton County personnel, reviews of inspection and inventory data, and reviews of Clinton County bridge records. The office evaluation assessed Clinton 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 Clinton 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
1437739	CLI T0100-0030	321	1981	38'	7A	6A
1430130	CLI C0002-0039	395	1979	16'	6A	same
1434586	CLI C0050-0233	111	1900	13'	7A	same
1433873	CLI C0040-0272	395	1938	15'	6A	same
1434616	CLI C0050-0400	232	1986	132'	6A	same
1430114	CLI C0002-0025	231	1979	209'	7A	6A

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 NHS system beginning April 1, 2015.

Clinton County has inspection responsibilities for 297 bridges, 134 of which are longer than 20 feet in length and 163 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. Clinton County records showed 297 bridges but there is a difference in the number of NBIS bridges. (135/162). The county indicated the difference is one bridge on Haley Road that was measured on a skew. Review of the inventory span lengths showed 1 bridge (SFN1439847) was possibly coded incorrectly as NBIS = Y or N. The county checked and found that it was incorrect and they immediately made the inventory change to show NBIS=N.

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"), and there are only minor issues in regards to complete compliance with the National Bridge Inspection Standards (NBIS). Comments are listed below.

Inspection Procedures

Clinton County uses their own staff to do the inspections. The inspector brings a laptop to the bridge. Comments from the previous inspection are brought to the bridge on the laptop. Ratings are marked up on the computer at the bridge and ratings are put into the BMS using the CEAO program. Comments are written on the CEAO program and a separate sheet. The county was informed that ratings of 5 or lower require complete comments describing Location, Extent, and Severity, including pictures or sketches. Clinton County inspection personnel are inspecting bridges in compliance with the Manual and the NBIS. The ratings properly reflected the field conditions within 1 rating value when compared to the Manual.

A review of the BMS inspection records indicated that an average of 5.9 and 10.7 inspections per day were completed in 2012 (they use primarily 2 different inspectors) and the highest

number was 16 inspections per day. In addition to using 2 inspectors, they also worked long hours on days off inspection, accounting for the higher numbers. The inspections include some smaller bridges between 10'-20' as well as NBIS length bridges. The county was advised that a high number of inspections per day (>10), while not a violation of the NBIS, it could result in deeper scrutiny of the inspection bridge program. Their use of 2 inspectors and longer hours were sufficient reason to explain the higher numbers.

The County does not need a snooper 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. Clinton 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. No bridges are inspected more often than once per year.

Qualification and Duties of Personnel

Mr. Jeff Linkous is the County Engineer and as such has overall responsibility for the bridge program. He is a PE and PS.

Mr. Adam Fricke is the Program Manager and a Team Leader. He also serves as the Reviewer. He is a PE and PS and has approximately 8 years inspection experience. He took the ODOT Level 1&2 Bridge Inspection courses in 2008 and a Refresher (SMS class) in March 2013. He is qualified as a Program Manager and Team Leader.

Mr. Gary Smith is a Team Leader. He has approximately 33 years bridge inspection experience. He took the ODOT Bridge Inspection Training most recently in 2008 and a Refresher training in 2013. He is qualified as a Team Leader.

Mr. Tom Hodson is a Team Leader. He is a PE and has approximately 25 years bridge inspection experience. He took the ODOT Bridge Inspection Training most recently in 2008 and a Refresher training in 2013. He is qualified as a Team Leader.

Inspection Reports

As part of this review, six bridges were field reviewed to compare conditions with the most recent BR-86. The General Appraisals and Summary Items for all 8 bridges matched the Manual within 1 rating value. Summary items correspond with the NBIS inspection items. All discrepancies were discussed at the bridge site. The inspection condition ratings were done in compliance with the Manual.

Inventory Items

During the Field Review, the CEAO QA/QC Engineer checked select inventory items and the following minor issues were found:
- SFN 1434586 had the approach roadway alignment incorrect
- SFN 1447165 had an incorrect structure type, it should be Pony Truss, not Thru Truss
- SFN 1430114 and 1434586 had incorrect ratings in the guardrail survey Item 69.
- SFN 1433873 had a Culvert Type Item 131 coded as Arch (Multiplate) but it should be Pipe-Arch, which also includes stone.
- SFN 1434586 had the wrong type of deck drainage Item 59, it should be "Other, Natural - off the bridge ends".
- SFN 1430130 had an incorrect Overall Structure Length because of the skew.

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

- all 3 trusses were coded as Thru trusses but they should be pony trusses
- SFN 1430572 had a maximum span length of 90', but 2 span with overall length of 93'. The county indicated the correct maximum span was 43'-7".

Also during the review of the BMS data, 0 (0.0%) bridges showed the General Appraisal did not match the lowest of the Superstructure, Substructure, or Culvert Summaries. This is excellent. Also, the 1-4 codes correlation to 0-9 codes was very good, finding only 7 (0.3%) instances of inconsistency. If deviations are necessary, then the inspection comments should explain why.

Files

Clinton County maintains Bridge files cabinet that include inspections, FC files, shop drawings, photos and sketches, load postings, and hydraulic data. Design calculations are kept in project files. Load rating reports are in the consultant files or on computer. Plans in are the plan file and most are also kept on computer.

Bridge load rating files for SFN 1431544, 1434780 and 1437739 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 for SFN 1442058 and 1441833 were checked and the FCM's were shown and identified. The bridges did have a Fracture Critical Plan but it did not include Fatigue Prone details. The county indicated the gusset plates are not welded, therefore are not fatigue prone. The county added a statement to the Fracture Critical Plan that there are no Fatigue Prone Details.

Gusset plate calculations were checked for SFN 1442058 and 1441833 and the PE name and signature were present. The unstiffened edge length test was included.

Load Rating
The inventory shows 134 (100.0%) of the County bridges have been load rated.

Load Posting
The BMS showed Clinton County has 0 bridges that are load posted for capacity and 0 posted for other reasons. 0 bridges are closed. If the county needs to post a bridge they would use Operating Rating to post their bridges and Silhouette signs would be used.

Special Features
The County has no bridges with special features.

Fracture Critical Bridges
Clinton County has 3 fracture critical bridges. All FC inspection are current.

Underwater Inspections and Scour
No bridges need an Underwater inspection. All bridges were evaluated for Scour.

QA/QC
The county does have a written internal QA/QC procedure, using their several qualified inspectors to check 5 bridges of another inspector..

Critical Findings
The county does have a Critical Findings procedure.

Bridge Maintenance
The County has a county crew to do bridge work. Work performed on bridges includes box culverts and new structures.

The county has a contract construction program that does complete replacements, deck and beam replacements and abutment rehab. The county uses federal funds and does use credit bridge funds.

Plans for emergency projects are done by office staff, and the work is done by county forces. Projects are selected by inspection conditions, sufficiency rating, traffic count and budget. Labor, equipment and materials are all documented.

CONCLUSIONS AND RECOMMENDATIONS

1. The following should be corrected:
- SFN 1434586 had the approach roadway alignment incorrect
- SFN 1447165 had an incorrect structure type, it should be Pony Truss, not Thru Truss
- SFN 1430114 and 1434586 had incorrect ratings in the guardrail survey Item 69.
- SFN 1433873 had a Culvert Type Item 131 coded as Arch (Multiplate) but it should be Pipe-Arch, which also includes stone.
- SFN 1434586 had the wrong type of deck drainage Item 59, it should be "Other, Natural - off the bridge ends".
- SFN 1430130 had an incorrect Overall Structure Length because of the skew.
- all 3 trusses were coded as Thru trusses but they should be pony trusses
- SFN 1430572 had a maximum span length of 90', but 2 span with overall length of 93'. The county indicated the correct maximum span was 43'-7".

NOTE: The County had made all of the above corrections by the end of November, 2013.

2. Bridge SFN1439847 was coded incorrectly as NBIS = Y. It should be N. The county made this correction immediately.

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

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 ** 98%				
23	Updating of Data				

** based on results of Field Review