National Bridge Inspection Standards &
Bridge Maintenance Program Review
Wood County
April 6, 2021

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

IN ATTENDANCE:

Joan Cherry, Wood County
Chad Moore, Wood County
James Householder, Wood County
Mark Stockman, CEAO Federal Bridge QA/QC Engineer
Mark Sherman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

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

Asset Name	TYPE	County Rating	Suggested NBIS Rating
WOO-C028A-0004 _(8738513)	Steel Beam	5A	same
WOO-T007D-0004 _(8731934)	Steel Pony Truss	5P	same
WOO-T040G-0001 _(8741018)	Concrete Slab	4A	same
WOO-T042H-0004 _(8741441)	Concrete Culvert	4A	same
WOO-T043F-0009 _(8741786)	Prestr. Box Beam	7A	5
WOO-T079C-0002 _(8745854)	Steel Beam	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.

Wood County has inspection responsibilities for 439 bridges, 306 of which are longer than 20 feet in length and 133 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

Wood County uses their own staff to do the Routine inspections. FC inspections are done by Poggemeyer Design Group. Previous year's inspection reports on paper are brought out and changes are made on that form and transferred to AssetWise in the office. Bridge comments are recorded in the inspection form and transferred to AssetWise. Bridge plans are available in the office and at the bridge. Photos are available for every bridge, and photos are taken (if needed) of defects during inspection.

The County indicated that an average of 6 inspections per day were completed in 2020. It takes about 45 minutes for Truss (pony/through/deck). It takes 45 minutes for Beam/Girders. For a slab, it takes about 30 minutes. For a Culvert, it takes about 30 minutes.

The County has 0 bridges that require a snooper.

A Team Leader is present at routine inspections.

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Wood County had 439 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 Program Manager determines the need for a routine inspection frequency greater than once a year, based on condition, critical items, replacement schedule, and haul routes.

There are 8 bridges that require inspections more frequently than one year. All bridges listed below are visited approximately monthly (unless noted) to monitor any changes

8749698 – Ault Road
8745900 – Long Judson Road

8745854 – Long Judson Road
8752184 – Rudolph Road
8744904 – Cloverdale Road
8737533 – Oil Center Road (closed, check barricades)
8738262 – Reigle Road (closed, check barricades)
8759375 – Poe Road (4 times a year , including annual inspection)

The county was advised to document the more frequent inspections.

Qualification and Duties of Personnel

Mr. John Musteric is the County Engineer. As such he has the overall responsibility for the bridge program.

Ms. Joanie Cherry is the Program Manager. She is a PE and has over 13 years of bridge inspection experience. She took ODOT Level 1 bridge training in 2008 and ODOT Level 2 training in 2009. She took a Refresher in 2017. The Refresher and Comprehensive classes are approved and uploaded to AssetWise. She is qualified to be the Program Manager.

Mr. James Householder is a Team Leader. He has 30 years of bridge inspection experience. He took ODOT Level 1 bridge training in 1994 and has a Legacy Grandfather Clause checklist to document his experience before 2006. He took a Refresher in 2020. The Refresher and Comprehensive classes are approved and uploaded to AssetWise. He is qualified to be a Team Leader.

Mr. Chad Moore is a Team Leader. He has 22 years of bridge inspection experience. He took ODOT Level 1 & 2 bridge training in 1999. He took a Refresher in 2020. The Refresher and Comprehensive classes are approved and uploaded to AssetWise. He is qualified to be a Team Leader.

Mr. Shane Johnson is a Team Member. He has 8 years of bridge inspection experience. He has an Associate's Degree in Civil Engineering, Owens Community College in 1993. He took ODOT Level 1&2 bridge training in 2015. He took a Refresher in 2020. He is not an active user in AssetWise. He is qualified to be a Team Leader. The county will be looking to add him as a user.

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.

Field Review

WOO-C028A-0004 (8738513) Steel - 02 - Stringer/Multi-beam or Girder - N- Not Applicable

Deck = 7
Superstructure = 5
Substructure = 7
Channel = 6
Scour = 7
Culvert = N
Defect Photos = Need better detail photos showing 100% secdtion loss at top of web
Channel Photos = need to be taken from channel looking at the bridge, not under the bridge looking away from it.
Comments= Need more LES to describe why the superstreucture rating is 5. Section loss on top of webs up to 100% - where?

Mark's comments – watch that pictures aren't too dark

WOO-T007D-0004 _(8731934) Steel - 10 - Truss - Thru - 1 - Pony Truss

Deck = 7
Superstructure = 6
Substructure = 5
Channel = 6
Scour = 7
Culvert = N
Defect Photos = NO picture of critical part of SUB – spalling undermining the bearing at the forward left bearing.
Channel Photos = NG - need to be taken from channel looking at the bridge, from the bridge looking away from it.
Comments= Need better LES in SUB comments. You say "Spalling is starting to undermine the forward left bearing" How much? Measurement, %?
Mark's comments – Substructure is rated 5 because of beam seats.
- Guardrail Survey is 0,N,N,N, it should be 0,0,0,0

WOO-T040G-0001 (8741018) Concrete - 01 - Slab - N- Not Applicable

Deck = 4
Superstructure = 4
Substructure = 5
Channel = 5
Scour = 7
Culvert = N
Defect Photos = Good
Channel Photos = need channel photos looking at bridge, not away from it, show both abutments

Comments= add to comments that beams are encased In conc slab. Need LES in Substr comments. Channel comments OK

Item 28A # Lanes on Structure is coded as 2. Should be 1`since bridge is 15.2' Rdway width curb-curb and <16' makes a 1 lane bridge

Item 72 Appr Rdway Alignment is coded as 4 but should be 6 since the alignment does not cause a major change in traffic speed

WOO-T042H-0004 (8741441) Concrete - 19 - Culvert (includes frame culverts) - N- Not Applicable

Deck = N
Superstructure = N
Substructure = N
Channel = 5
Scour = 7
Culvert = 4
Photos = GOOD
Channel Photos = NG - need to be taken from channel looking at the bridge, from the bridge looking away from it.

Comments= Pretty good. Add size of spalling and # of rebars exposed

WOO-T043F-0009 (8741786) Prestressed concrete - 05 - Box Beam or Girders - Multiple - N- Not Applicable

Deck =	7
Superstructure =	7 should be 5 for leakage
Substructure =	7
Channel =	4
Scour =	6
Culvert =	N
Photos =	Substr OK – Superstr need better photo of leakage between beams
Channel Photos =	NG need to be looking at bridge, not away from it
Comments=	OK – describe LES of leakage

Mark's comments – Possible Transverse cracks found in beams 1, 4 & 6. County found they are seams from manufacture process

WOO-T079C-0002 (8745854) Steel - 02 - Stringer/Multi-beam or Girder - N- Not Applicable

Deck =	6
Superstructure =	3
Substructure =	7
Channel =	7
Scour =	7
Culvert =	N
Photos =	Good – shows beam problems
Channel Photos =	NG need to be looking at bridge, not away from it
Comments=	Good – shows LES

Mark's comments – % Legal shows 130% but the bridge is Posted. Need to correct the **Item 734.** Also – please add posting date to Item 70.01 The county will fix this.

Inventory Items

Review of the bridge data showed 0 out of 306 bridges had no comments when the rating was <=5, and review of the 6 bridges in the field showed 3 bridges where comments were incomplete, missing sufficient detail with LES described in AssetWise when the rating was 5 or lower. This requirement became effective Nov of 2020.

Files

Wood County keeps files as follows:

- Inspection reports, including old inspections electronically, paper copies in binders
- Design Calculations paper in bridge folders and/or electronically
- Plans paper in bridge folders and/or electronically
- Load analysis calculations paper in bridge folders and/or electronically
- Inventory forms AssetWise or BMS
- Photos and sketches electronically
- Repairs and maintenance history paper in bridge folders and/or electronically
- Scour evaluation bridge folder
- Scour POA n/a (bridge folder)
- Fracture Critical File electronically
- Load Posting/Closing paper in bridge folders and/or electronically
- Underwater inspections n/a
- Special inspection eqpt. or procedures n/a
- Flood data, waterway adequacy, channel cross sections bridge folder, ditch plans

Load Rating

The inventory shows 306 (100.00%) of the County NBIS bridges have been Load Rated or Load Rating was not applicable. There are 11 NBIS bridges evaluated by documented engineering judgement.

Load Ratings were checked for SFNs 8755876, 8753458, 8730946, and 8749434. 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. BR100 form is available for all engineering judgment bridges.

Load Posting

Wood County has 54 NBIS bridges that are load posted. There is 1 bridge closed for condition ratings. Posting is based on Operating Rating. R12-H5 signs are the type of sign used for load posting.

Special Features

There are 0 bridges with unique or special features.

Fracture Critical Bridges

The FC bridge inspection frequency is 24 months. FC plans for SFN 8746842 and 8755876 were reviewed. The FCM's identified, FC Inspection Procedure and Fatigue Prone details are also included and sufficient.

Gusset Plate calculations were satisfactory for 8755876..

Underwater Inspections and Scour

Wood county does not have any bridges that require dive inspections.

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. The Inventory items are input by one person and checked by someone else. Inspections are checked by sampling with outside inspections by Fulton County Bridge Engineer.

Critical Findings

The county does have a Critical Findings Procedure in place (using the ODOT inspection manual). The county engineer, or bridge engineer, or Terry Hummel is notified for emergency work.

Bridge Maintenance

The County does contract bridge work. The typical work is for superstructure replacements, complete replacements, major rehabilitation. The approximate annual budget is approximately $1.5 – 2.0 million. Fed Funds and Credit Bridge Funds are used.

The county does force account bridge work and uses highway maintenance crews as needed. Typical work items include superstructure replacements, culvert replacements, guardrail repair, and maintenance. The approximate budget is $250,000.

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 **				
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
14	load rated after inspection, add date sign was posted