National Bridge Inspection Standards &
Bridge Maintenance Program Review
Coshocton County
July 1, 2021

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

IN ATTENDANCE:

Fred Wachtel, Coshocton County Engineer
Josh Kempf, County
Mark Sherman, CEAO Federal Bridge QA/QC Engineer
Melinda Chase, Consultant
Omar Abu-Hajar, ODOT
Alexis Bogen, FHWA

SCOPE OF REVIEW:

The review consisted of interviews with Coshocton County personnel, reviews of inspection and inventory data, and reviews of Coshocton County bridge records. The office evaluation assessed Coshocton County's organization, procedures, resources, and documentation regarding the inspection, inventory, and maintenance operations for bridges. In addition, field reviews of **7** 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 Coshocton County to represent a variety of structure types and conditions. The bridges checked during the field review were:

Asset Name	Bridge Type	County Rating	NBIS Rating
COS-T0025-0002 _(1631322)	Timber Truss	4	Agreed
COS-C0024-0001 _(1630385)	Prestressed Box Beams	4	5 is more accurate
COS-T0170-0001 _(1631667)	Steel Beams	5	Agreed
COS-C0106-0002 _(1630628)	Steel Pony Truss	5	Agreed
COS-T0124-0001 _(1633597)	Steel Beams	5	Agreed
COS-C0274-0007 _(1633538)	Prestressed Box Beams	5	Agreed
COS-T0483-0002 _(1633643)	Concrete Slab	4	Agreed

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.

Coshocton County has inspection responsibilities for **269** bridges, **127** of which are longer than 20 feet in length and **142** 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:

Coshocton County uses their own staff to do the inspections and supplements it using Hammontree Consultants. Previous inspection reports are available at site for review. The previous year's inspection reports are on paper and transferred to AssetWise in the office. Bridge comments are recorded in the inspection form.
Bridge plans are available in the office. Photos are available for every bridge, and photos are taken (if needed) of defects during inspection and posted in Assetwise.
The County has **0** bridges that require a snooper.
A Team Leader is present at routine inspections.

Frequency of Inspections (Metric 6 & 7)

Ohio State Transportation Laws require all State and local bridges to be inspected annually.
Coshocton County had **269** 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, based on inspections and history.
There are no bridges that require inspection more frequently than one year.
Coshocton County had **0** bridges overdue for Fracture Critical inspection at the time of this field review.

Qualification and Duties of Personnel (Metric 1 & 2)
Program Manager:
Karl J. Oprisch, P.E.
List qualifications/yrs. Experience. 34 years

List courses attended (& approx. dates).
ODOT Bridge inspection Level 1 Sept. 20-22 2011
ODOT Bridge inspection Level 2 Oct. 11-13 2011
ODOT Refresher class Jan. 29 2021

Team Reviewer and Load Rating Engineer:
Melinda Chase P.E. Ohio PE # 71772

List qualifications/yrs. experience (bridge inspection experience)
19 years experience
List courses attended (& approx. dates).
ODOT Bridge inspection Level 1 Feb. 4-6 2003
ODOT Bridge inspection Level 2 April 12, 2006
ODOT Refresher class Feb. 5-6 2017
ODOT Refresher class April 8, 2021

Team Leader:
Samantha D. Greene, P.E.
List qualifications/yrs. experience (bridge inspection experience)
4 years
List courses attended (& approx. dates).
ODOT Bridge inspection Level 1 August 30, 2018
ODOT Bridge inspection Level 2 September 27, 2018
ODOT Refresher class April 08 2021

Underwater Bridge inspector: NA

Inspection Reports (metric 12)

As part of this review, eight bridges were field reviewed to compare conditions with the most recent inspection report. The individual condition ratings for all of the field sampled 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:

COS-T0025-0002 _(1631322) Timber Truss
Item 58 Deck…… 5 Agreed
Item 59 Superstructure……4 Agreed *(some minor repairs could bring this up to a 5 or 6)*
Item 60 Substructure…….7 Agreed
Item 61 Channel……..7 Agreed
Item 61.01 Scour……..7 Agreed
Item 62 Culvert……N
Item 36 Railing…….. 0 0 0 0 Agreed
Item 72 Approach Alignment …….. 3 Agreed
Comments: Very Good Comments in Assetwise.

Defect Photos: Great Photos in Assetwise that compliment the comments.
Channel Photos: Photos in Assetwise are as good as can be had given the nature of the site.

COS-C0024-0001 _(1630385) Prestressed Box Beams

Item 58 Deck…… 4 Agreed
Item 59 Superstructure……4 *After consulting the manual, the percentage of area spalled seems to be within the 15% of beam width, that may put it close to a 6. However, only a more accurate measurement can prove one way or the other. I believe a 5 would better rate the superstructure.*
Item 60 Substructure…….4 *Again, looking to the manual for guidance, The abutment would need to over 10% affected. Once you sound the areas around the rust stains, it doesn't add up to 10%, plus take into account that a portion of the rust stains is coming from a source other than the rebar, this could be a 6. I would go with a 5 on the abutments as well, since I did not sound the entirety of both abutments.*
Item 61 Channel……..7 Agreed
Item 61.01 Scour……..7 Agreed
Item 62 Culvert……N
Item 36 Railing…….. 0 0 0 0 Agreed
Item 72 Approach Alignment …….. 8 Agreed
Comments: Excellent comments.
Defect Photos: Great defect photos in Assetwise.
Channel Photos: Very Channel Photos in Assetwise.

COS-T0170-0001 _(1631667) Steel Beams

Item 58 Deck…… 5 Agreed
Item 59 Superstructure……6 Agreed
Item 60 Substructure…….5 Agreed
Item 61 Channel……..4 Agreed
Item 61.01 Scour……..6 Agreed
Item 62 Culvert……N
Item 36 Railing…….. 0 0 0 0
Item 72 Approach Alignment …….. 8 Agreed
Comments: Great Comments
Defect Photos: Great Defect Photos
Channel Photos: Great Channel Photos

COS-C0106-0002 _(1630628) Steel Pony Truss

Item 58 Deck…… 5 Agreed
Item 59 Superstructure……5 Agreed
Item 60 Substructure…….6 Agreed
Item 61 Channel……..6 Agreed
Item 61.01 Scour……..6 Agreed
Item 62 Culvert……N
Item 36 Railing …….. 0 0 0 0
Item 72 Approach Alignment …….. 4 Agreed

Comments: Could use a little more detail in the comments. They are a little general and lack the LES touch. The Comments and defect photos should complement each other.
Defect Photos: Good Defect Photos
Channel Photos: The photos in Assetwise are as good as you could get from accessible areas.

COS-T0124-0001 _(1633597) Steel Beams
Item 58 Deck……..6 Agreed
Item 59 Superstructure……6 Agreed
Item 60 Substructure…….5 Agreed
Item 61 Channel……..6 Agreed
Item 61.01 Scour……6 Agreed
Item 62 Culvert……N Agreed
Item 36 Railing…… 0 0 0 0 Agreed
Item 72 Approach Alignment …….. 6 Agreed
Comments: Good Comments, again a little more L E S would make them great.
Defect Photos: Good Defect Photos
Channel Photos: Great Channel Photos

COS-C0274-0007 _(1633538) Prestressed Box Beams
Item 58 Deck…….. 5 Agreed
Item 59 Superstructure……5 Agreed
Item 60 Substructure…….6 Agreed
Item 61 Channel……..5 Agreed
Item 61.01 Scour……6 Agreed
Item 62 Culvert……N
Item 36 Railing…….. 0 0 0 0 Agreed
Item 72 Approach Alignment …….. 3 Agreed
Comments: Excellent Comments
Defect Photos: Excellent Defect Photos in Assetwise.
Channel Photos: Acceptable, need a drone shot to get any better.

COS-T0483-0002 _(1633643) Concrete Slab
Item 58 Deck…….. 4 Agreed
Item 59 Superstructure……4 Agreed
Item 60 Substructure…….4 Agreed
Item 61 Channel……..6 Given the amount of sediment built up at the fascia line this bridge cannot be functioning as design for hydraulic purposes. I would give the channel a 5, or a 4 if the road is overtopping.
Item 61.01 Scour……4 Agreed
Item 62 Culvert……N
Item 36 Railing…….. 0 0 0 0 Agreed
Item 72 Approach Alignment …….. 3 Agreed
Comments: Great Comments
Defect Photos: Great Defect Photos
Channel Photos: Great channel photos

Inventory Items

A revised review of the bridge data showed Missing comments were addressed from **8 to 0 bridges** out of **127** were missing comments when the rating was <=5. All having to do with Item 61.01. It is possible that many of the scour comments were made in the substructure and channel Items and not repeated in the scour item. To alleviate the error messages, it would be useful to just note in a comment under scour that there are comments in the channel or substructure items. That way you do not have to repeat the comment again in scour.

This requirement became effective Nov of 2020.

Two bridges could have used more detailed comments.

Zero bridges are late in inspection scheduling according to the dates in Assetwise.

Bridge Files: (Metric 15)

Coshocton County keeps files listed below as follows: All of Coshocton County's bridge data and information is on file at the office unless otherwise indicated below.

- Inspection reports, including old inspections. Current Insp. Report in Assetwise
- Design Calculations.
- Plans.
- Load analysis calculations. Assetwise and in bridge File
- Inventory forms.
- Photos and sketches. Assetwise and in bridge File
- Repairs and maintenance history.
- Scour evaluation.
- Scour POA.
- Fracture Critical File.
- Load Posting/Closing.
- Underwater inspections.
- Special inspection eqpt. or procedures.
- Flood data, waterway adequacy, channel cross sections. Channel photos in Assetwise.

Note the NBIS Retention period: BR-86 report 10 years, All records 3 years after bridge removed, Load rating calculations 3 years after a new rating is done.

Load Rating (metric 13)

The inventory shows 127 (99.00%) of the County NBIS bridges have been Load Rated or Load Rating was not applicable. There are 4 NBIS bridges evaluated by documented engineering judgement using the BR100 form.

Load Ratings were checked for **SFNs 1634844; 1631071; 1630539.** 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.

Zero NBIS bridges have not load rated.

Six bridges (now 0) had Operating ratings equal to the Inventory rating. Column AM in the Load Rating Tab of Snapshot file. Four (now 0) Bridges have the %legal load not tied to the lowest Load Rating Factor Three (now 0) bridges do not have the Operating and Inventory rating in whole numbers.

Load Posting (metric 14)

Coshocton County has **15** NBIS bridges that are load posted. There are no bridges closed for condition ratings. Posting is based on Operating Rating. R12-H5 signs are the type of sign used for load posting.

The County has **13** bridges that are posted, but no posting date entered in Assetwise for sign installation **Item 70.01**.

There are 0 bridges where the % legal (Item 41) does not match the Posting code A or P (Item 734)

There is 1 bridge rated 3 tons or less that is not closed (the covered bridge SFN 1631322) OK.

Special Features: There are 0 bridges with unique or special features.

Fracture Critical Bridges (Metric 16)

The FC bridge inspection frequency is 12 months, done with routine annual inspections.

FC plans for **SFN 1630016; 1630628,** were reviewed and the FCM's identified.

Gusset Plate calculations were satisfactory for **SFNs 1630016; 1630628**..

Underwater Inspections and Scour: (metric 9 & 17) **NA**

METRIC 16 - Fracture Critical Inspection	(from files examination)			
From Files review	**Missing**	**# FC**	**% PASS**	**COMPLIANCE**
Fract Critical Member ID	0	2	100.0%	(C)
Fatigue Prone Detail	0	2	100.0%	(C)
Gusset Plate Calculations	0	2	100.0%	(C)
FC Inspection Procedure	0	2	100.0%	(C)
METRIC 17 - Underwater Inspection	(from files examination)			
From Files review	**Missing**	**# UW**	**% PASS**	**COMPLIANCE**
UW Inspection Procedure	0	0	100%	(C)
Location of UW elements	0	0	100%	(C)
UW frequency identified	0	**0**	100%	(C)

From Snapshot files

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. The Inventory items are checked and updated during annual inspections.

Critical Findings (metric 21)

The county currently does not have any critical findings, but does have a Critical Findings Procedure in place (using the ODOT inspection manual). The county engineer is the bridge inspector and develops the plans for emergency work.

Bridge Maintenance (From Questionnaire)

The County does contract bridge work. The typical work is for large bridges, replacements and repairs. Fed Funds are sometimes used for bridge deck replacement and Credit Bridge Funds are used for bridge replacements. The annual budget varies from year to year but averages **$400,000.00** for Contract work.

The county does force account bridge work and uses highway maintenance crews as needed.

Typical work items include all repairs and medium replacements. The annual budget for force account work is approximately **$550,000.00.**

The chart below is a review of the 23 Metrics used to measure NBIS compliance and the chart represent 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

Action Items for Coshocton County:

Metric 12 County needs to avoid future errors in the comment area with placing a comment in the Scour Critical summary item when scour is rated 5 or less. If the comment is already in the Substructure or Channel Summaries, then only a note stating as such will suffice and prevent an error from appearing.

Metric 14 Enter bridge posting sign installation dates in Assetwise