National Bridge Inspection Standards &
Bridge Maintenance Program Review
Pickaway County
May 26, 2021

(Data update Oct 21)

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

IN ATTENDANCE:

Chris Mullins, Pickaway County Engineer
Anthony Neff, Pickaway County
Mark Sherman, CEAO Federal Bridge QA/QC Engineer
Mark Stockman, CEAO Federal Bridge QA/QC Engineer
Jared Backs, ODOT
Kenny Tong, FHWA

SCOPE OF REVIEW:

The review consisted of interviews with Pickaway County personnel, reviews of inspection and inventory data, and reviews of Pickaway County bridge records. The office evaluation assessed Pickaway County's organization, procedures, resources, and documentation regarding the inspection, inventory, and maintenance operations for bridges. In addition, field reviews of 6 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 Pickaway 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
PIC-T0099-0200 _(6531717)	Concrete slab	4	Agreed
PIC-T0020-0348 _(6530508)	Steel Beam	7	We rated it a 6
PIC-C0090-0189 _(6532136)	Steel Pony Truss	5	We rated it a 4
PIC-T0038-0136 _(6532748)	Prestressed Box beams	5	Agreed
PIC-C0502-0039 _(6531830)	Masonry Culvert	3	Agreed
PIC-T0189-0213 _(6532594)	Concrete Cont. Slab	5	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

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.

Pickaway County has inspection responsibilities for **274** bridges, **139** of which are longer than 20 feet in length and **135** 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:

Pickaway County uses their own staff to do the inspections. 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.
Pickaway County had **274** 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.
Pickaway County had **0** bridges overdue for Fracture Critical inspection at the time of this field review.

Qualification and Duties of Personnel (metric 2)

Program Manager:

1. Name of individual who is the **Program Manager** (makes FINAL DECISION). List qualifications/yrs. experience (bridge inspection experience)
(Metric 1&2)

- Name: _Anthony Neff_____
- Yrs. Inspection related experience: _13 years___
- List courses attended (& approx dates) _see Assetwise_____

Ohio DOT Refresher (Online) 01/01/2021,
Ohio DOT Refresher (Online) 03/23/2021,
Ohio DOT Refresher (Online) 1/31/2021,
Ohio DOT Refresher (Online) 01/31/2021,
Ohio DOT Refresher (Online) 01/31/2021,
Ohio DOT Refresher (Online) 02/01/2021,
Ohio DOT Level 1 - Basic (3-day) 03/25/2008,
Ohio DOT Level 2 - Advanced (3-day)

2. Name of individual in charge of bridge inspection unit (**Reviewer**). List qualifications/yrs. experience (bridge inspection experience)
(Metric 1)

- Name: _Sterlin Mullins_____
- Yrs. Inspection related experience: _13 years
- List courses attended (& approx dates)

Level 1 & 2, March 2008.
Scour assessment 9/2008,
Load rating 4/2009, BMS, 2/2009,
Bridge inspection refresher 3/2013, 11/2011, 3/2011,
Element Level inspection training, 11/2015

10. **Load Rating Engineer** – Name of individual responsible for load ratings (must be PE) **(Metric 4)**

a. List Ohio PE # _Anthony Neff 70171

Underwater Bridge inspector: Integrity Aquatic; Travis Clower PE Procedure and report on file.

Inspection Reports (metric 12)

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 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:

PIC-T0099-0200 _(6531717) Concrete slab

Item 58 Deck…….. 4 Agreed

Item 59 Superstructure……4 Agreed

Item 60 Substructure……4 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 …….. 8 Agreed

Comments: Excellent

Defect Photos: Excellent

Channel Photos: The photo on the left Could be a little better, if you can get both abutments in the pic.

Angles are a little too acute to get both abutments in, plus the channel Photo on the right is much better.

PIC-T0020-0348 _(6530508) Steel Beam

Item 58 Deck…….. 5 We found several areas where the Corrugated metal decking had rusted through exposing the asphalt fill. Looking at the Steel evaluation chart this should be a 3

Item 59 Superstructure……7 There is a significant amount of rust and pitting. This is looking like a 6 to us, but your rating is within the 1 point tolerance differential

Item 60 Substructure……5 Agreed

Item 61 Channel……..5 Agreed

Item 61.01 Scour……7 Agreed

Item 62 Culvert……N

Item 36 Railing…….. 0 0 0 1 The anchor assemblies did not appear to be correct? May be a 0

Item 72 Approach Alignment …….. 6 Agreed

Comments: Excellent Comments

Defect Photos: Could use some defect photos of underside of deck where section loss is prevalent. No rail damage photos

Channel Photos: Very Good Channel photos

PIC-C0090-0189 _(6532136) Steel Pony Truss

Item 58 Deck…….. 6 Agreed

Item 59 Superstructure……5 Truss is in good condition, the floor beams are rusted (cold not get close) and Stringers are heavily rusted north facia stringer one is almost completely gone at forward abutment being crushed at #8 floor beam. FB#1 has approx. 50% section loss and FB#7 has about 20%. Multiple stringers have section loss. We arrived at a rating of a strong **4.** Within the 1 pt. rule of tolerance.
Item 60 Substructure…….6 Agreed
Item 61 Channel……..8 Agreed
Item 61.01 Scour……7 Agreed
Item 62 Culvert……N
Item 36 Railing…….. 0 0 0 1 Agreed
Item 72 Approach Alignment …….. 4 Agreed
Comments: Great Comments
Defect Photos: Great Defect Photos
Channel Photos: Could not find Channel photos. Given length of bridge and heavily treed stream banks, Channel measurements may be a better option here.

PIC-T0038-0136 _(6532748) Prestressed Box Beams
Item 58 Deck…….. 5 Agreed
Item 59 Superstructure……5 Agreed
Item 60 Substructure…….7 Agreed
Item 61 Channel……..6 Agreed
Item 61.01 Scour……7 Approaching a 6 with top of footings exposed (within 1 pt)
Item 62 Culvert……N
Item 36 Railing …….. 0 0 1 0 GR too low
Item 72 Approach Alignment …….. 6 Agreed
Comments: Super comments!!!!
Defect Photos: Good defect photos
Channel Photos: Good Channel Photos

PIC-C0502-0039 _(6531830) Masonry Culvert
Item 58 Deck……..N
Item 59 Superstructure……N
Item 60 Substructure…….N
Item 61 Channel……..5 Agreed
Item 61.01 Scour……6 Agreed
Item 62 Culvert……3 Agreed
Item 36 Railing…… 0 0 0 0 Agreed
Item 72 Approach Alignment …….. 5 Agreed
Comments: Good Comments
Defect Photos: Great Defect Photos
Channel Photos: Channel Photos limited by proximity to Scioto River

PIC-T0189-0213 _(6532594) Concrete Cont. Slab

Item 58 Deck…… 6 We think it should be a 7. For slab bridges the deck and the superstructure are one in and same, so the ratings must be the same. Having said that, we can see how you arrived at your ratings.
Item 59 Superstructure……7 Agreed
Item 60 Substructure…….5 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 …….. 8 Agreed
Comments: Excellent Comments
Defect Photos: Would like to see more defect Photos in Assetwise.
Channel Photos: Need to improve on these. Channel measurements may work better to this size bridge and location.

Inventory Items:

Review of the bridge data showed **7** out of **138** bridges were missing comments when the rating was <=5. This requirement became effective Nov of 2020. See Snapshot Lie for bridges in question. **1** bridge should have Scour governing the substructure rating. SFNs: PIC-C0016-0826 _(6534538). And **that same bridge** has a disparity of 2 or more change in points for scour.

Files: Pickaway County keeps files listed below as follows:

Traditionally bridge files, but moving over to Assetwise.

- Inspection reports, including old inspections Assetwise
- Design Calculations Bridge folder
- Plans Bridge Folder
- Load analysis calculations Assetwise/bridge folder
- Inventory forms Assetwsie
- Photos and sketches Assetwise
- Repairs and maintenance history Bridge Folder
- Scour evaluation
- Scour POA
- Fracture Critical File Assetwise
- Load Posting/Closing Assetwise
- Underwater inspections 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 139 (100.00%) of the County NBIS bridges have been Load Rated or Load Rating was not applicable. There are **7** NBIS bridges evaluated by documented engineering judgement using the BR100 form.
Load Ratings were checked for **SFNs 6532136.** 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.
Eight Bridges have the %legal load not tied to the lowest Load Rating Factor:

Inspection Condition Data - NBIS Bridges Only

Item 41	Operating Status	CODE	# NBIS	# ALL	
Data Tab	Open, No restriction	A	136	269	
Col AM	Open, posting recommended	B	0	0	
	Open, Half width constr.	C	0	0	
	Open because of temp. fix	D	0	0	
	Open using temp. structure	E	0	0	
	New struture not yet open	G	0	1	
	closed for load cap. reason	K	1	1	
	Posted for load capacity	P	2	4	
	Posted for other than load	R	0	0	
	Closed for other than load	X	0	0	
			139	275	Extra SFN PIC-T0127-0236 _(6533168) Proposed

Load Rating Data

Load Rating Tab		# OF ERRORS	
Col. AN	Op RF greater than Inv RF?	0	
Col. AO	Posting and % Legal OK?	0	
Col. AP	"0" used instead of blank	0	
Col. AT	% legal <> lowest RF	0	
Col.A V	Item 70 correct?	0	
Col. AW	Method of Rating Alike?	0	
Col. AX	Op & Inv RF in Tons as req'd?	0	
Col. AY	Item 575 correct?	0	
Col. AZ	Depth of fill completed?	1	PIC-T0188-0280 _(6531004) need depth of fill in Item 580

Load Posting (metric 14)

Pickaway County has **4** NBIS bridges that are load posted. There is **0** 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 **one** bridge that is posted, but no posting date entered in Assetwise for sign installation.

PIC-T0194-0082 _(6532527)

There are **0** bridges where the % legal (Item 41) does not match the Posting code A or P (Item 734 See Column S & T in the Load Rating TAB

There are **0** bridges rated **3** or less that are not closed.

METRIC 14 - Posting	Load rating data tab			
From Files review	# errors	#sampled	% PASS	COMPLIANCE
Op RF < 3 tons but not closed	0	139	100.0%	(C)
Op RF = 0 but not closed	0	139	100.0%	(C)
% Legal < 100 but not posted	0	139	100.0%	(C)
Item 41 = B	0	139	100.0%	(C)

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

Fracture Critical Bridges (Metric 16) (12 bridges are Fracture Critical)

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

FC plans for **SFN 6533639** Hayesville Road Bridge, was reviewed and the FCM's identified.

Gusset Plate calculations were satisfactory for **SFN 6533639**.

Underwater Inspections and Scour: 2

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.

Routine Inspection Frequency: There were no bridges that were past due for inspection.

METRIC 6 Insp. Frequency Routine						
Bridge Inspections Overdue			**# OVERDUE**		**% PASS**	**COMPLIANCE**
Data Tab	NBIS -	24 months	0		100.0%	(C)
Col. AB	ORC -	Calendar Year	0		100.0%	(C)
	BIM -	18 months	0		100.0%	(C)
METRIC 8 - Insp. Frequency Underwater						
Dive Inspections Overdue			**# OVERDUE**	**# UW**	**% PASS**	**COMPLIANCE**
Data Tab Col. Z		60 months	0	2	100.0%	(C)
METRIC 10 - Insp. Frequency FC Member						
FC Inspections Overdue			**# OVERDUE**	**# FC**	**% PASS**	**COMPLIANCE**
Data Tab Col. Y		24 months	0	12	100.0%	(C)

Inspection Comments: All of the sample bridges had excellent comments. Of the Snapshot file check, there were on only a handful of bridges that were missing comments. Most of them were for channel or scour comments for the Channel items. Upon closer inspection of the data, almost all of the lacking comments were in the comments under the substructure Item.

METRIC 12 - Routine Inspection										
Field Ratings		# > +/-1	# Ratings	% PASS	COMPLIANCE					
	field ratings	0	24	100.0%	(C)					
Comments		Missing	# < 6	% PASS			PIC-T0020-0348 _(6530508)	PIC-T0031-0293 _(6533329)	PIC-T0066-0259 _(6534422)	PIC-T0038-0136 _(6532748)
Tab	Comments when Rating < 6	7	138	94.9%	(C)	See Comments TAB	PIC-T0029-0074 _(6532985)	PIC-T0038-0778 _(6533965)	PIC-T0187-0050 _(6534481)	
		Error	Total Scour	% PASS		The errors above are mostly Lack of comments in the ITEM 61 Channel item.				
Comments	Rating should be = Scour	1	134	99.3%	within tolerance +/- 1	Although comments about scour are in the abutment item, there is a need for channel comments outside of the birdge shadow.				
Tab	Noncompliant Scour Rating Err	1	134	99.3%	(C)	PIC-C0016-0826 _(6534538) See Comments TAB Scour rules				

Inspection Condition Data - NBIS Bridges Only

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Col AM	Open, posting recommended	B	0	0	
	Open, Half width constr.	C	0	0	
	Open because of temp. fix	D	0	0	
	Open using temp. structure	E	0	0	
	New struture not yet open	G	0	1	
	closed for load cap. reason	K	1	1	
	Posted for load capacity	P	2	4	
	Posted for other than load	R	0	0	
	Closed for other than load	X	0	0	
			139	275	Extra SFN PIC-T0127-0236 _(6533168) Proposed

Load Rating Data

Load Rating Tab		# OF ERRORS	
Col. AN	Op RF greater than Inv RF?	0	
Col. AO	Posting and % Legal OK?	0	
Col. AP	"0" used instead of blank	0	
Col. AT	% legal <> lowest RF	0	
Col.A V	Item 70 correct?	0	
Col. AW	Method of Rating Alike?	0	
Col. AX	Op & Inv RF in Tons as req'd?	0	
Col. AY	Item 575 correct?	0	
Col. AZ	Depth of fill completed?	1	PIC-T0188-0280 _(6531004) need depth of fill in Item 580

Channel Photos: The bridges samples in the review had a mixed bag of channel photos, some were very good and others need improvement.

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 **$100,000.00** - **$5,000,000.00** 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 **$100,000.00- $700,000.00.**

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 Pickaway County: