

# National Bridge Inspection Standards & Bridge Maintenance Program Review

## Jackson County

August 4, 2021

(October 21 data update)

By: Mark Sherman, PE

CEAO Federal Bridge QA/QC Engineer

### IN ATTENDANCE:

Melissa Miller, Jackson County Engineer

Mark Sherman, CEAO Federal Bridge QA/QC Engineer

Jason Popa, Consultant

Omar Abu-Hajar, ODOT

### SCOPE OF REVIEW:

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

<u>Asset Name</u>	<u>Bridge Type</u>	<u>County Rating</u>	<u>NBIS Rating</u>
<a href="#">JAC-T0713-0076_(4033302)</a>	Concrete slab	4	Agreed
<a href="#">JAC-T0119-0197_(4032144)</a>	Steel Beam	4	Agreed
<a href="#">JAC-C0002-0541_(4030176)</a>	Steel Pony Truss	5	Agreed
<a href="#">JAC-C0015-0191_(4033574)</a>	Timber Beams	4	Agreed
<a href="#">JAC-C0084-0156_(4034309)</a>	Steel Culvert multi-cell	4	Agreed
<a href="#">JAC-C0076-0425_(4031857)</a>	Concrete Tee beams	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 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.

**Jackson County** has inspection responsibilities for **259** bridges, **146** of which are longer than 20 feet in length and **113** 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:**

**Jackson County** Supplements their own staff with Popa Consultants 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.

**Jackson County** had **259** 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.

Jackson 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:**

**Melissa Miller, Jackson County Engineer**

List qualifications/yrs. Experience.

Engineer for county for 13 years. 3

List courses attended (& approx dates).

Bridge Refresher Course-1/22/2020,

Bridge Refresher Course-6/15/2016,  
Level II Br. Insp.-July, 2009,  
Level I Br. Insp.-November 2008.

**Team Leader and Team Reviewer and Load Rating Engineer:**

Jason Popa PE, Consultant: Ohio PE # 60606

List qualifications/yrs. experience (bridge inspection experience)  
30 yrs. Experience

List courses attended (& approx. dates).  
Resume and qualification up to date and on file.

**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:**

JAC-T0713-0076\_(4033302) Concrete slab

- Item 58 Deck..... 4 Agreed
- Item 59 Superstructure.....4 Agreed
- Item 60 Substructure.....5 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 ..... 8 Agreed

Comments: Very Good Comments in Assetwise.

Defect Photos: Photos not in Assetwise, but office files contain good photos.

Channel Photos: Photos in Assetwise are acceptable, however they can be greatly improved if taken when vegetation is not obscuring the abutments.

JAC-T0119-0197\_(4032144) Steel Beam

- Item 58 Deck..... 6 Agreed *(wheel ruts developing in timber decking. (Less than 1 inch deep))*
- Item 59 Superstructure.....4 Agreed *Well documented defects*
- Item 60 Substructure.....5 Agreed *(Could easily be a 4 based on 3-inch deep spalling on north abutment. Horizontal crack has formed at a cold joint in the concrete. However, beams are seated back more than a foot on 12-inch continuous steel channel shape, that helps mitigate the spalling and Comments from the inspector regarding the lack of change over the past 5 years, would indicate 5 as an acceptable rating at present.)*

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: **Good comments. However, I would like to see a little more detail, such as which beams have, or are developing holes in the webs. This is important with respect to load path and could affect the condition rating in the future. L.E.S. is a good thing.**

Defect Photos: **Great defect photos in Assetwise.**

Channel Photos: **Acceptable Channel Photos in Assetwise, but could be improved if taken when less vegetation is obscuring the abutments.**

**JAC-C0002-0541\_(4030176)** Steel Pony Truss

Item 58 Deck..... 6 Agreed  
Item 59 Superstructure.....5 Agreed  
Item 60 Substructure.....8 Agreed  
Item 61 Channel.....7 Agreed  
Item 61.01 Scour.....7 Agreed  
Item 62 Culvert.....N  
Item 36 Railing..... 0 0 0 0  
Item 72 Approach Alignment ..... 8

**(Based on geometry and proximity of approach curve, I recommend an 7 rating.)**

Comments: **Good Comments**

Defect Photos: **Very good Defect Photos**

Channel Photos: **Really need to get the vegetation out of the photos to see the channel and abutments.**

**JAC-C0015-0191\_(4033574)** Timber Beams

Item 58 Deck..... 4 Agreed  
Item 59 Superstructure.....5 Agreed  
Item 60 Substructure.....4 Agreed  
Item 61 Channel.....5 Agreed  
Item 61.01 Scour.....7 Agreed  
Item 62 Culvert.....N  
Item 36 Railing ..... 0 0 0 0  
Item 72 Approach Alignment ..... 5 Agreed

Comments: **Good, but brief Comments**

Defect Photos: **Great Defect Photos**

Channel Photos: **NA (over RR tracks)**

**JAC-C0084-0156\_(4034309)** Steel Culvert multi-cell

Item 58 Deck.....N  
Item 59 Superstructure.....N  
Item 60 Substructure.....N  
Item 61 Channel.....4 Agreed  
Item 61.01 Scour.....6 Agreed  
Item 62 Culvert.....4 Agreed  
Item 36 Railing..... 0 0 0 0 Agreed  
Item 72 Approach Alignment ..... 8 Agreed

Comments: **Good Comments**

Defect Photos: [Great Defect Photos](#)  
Channel Photos: [Great Channel Photos](#)

JAC-C0076-0425\_(4031857) Concrete Tee beams  
Item 58 Deck..... 6 [Agreed](#)  
Item 59 Superstructure.....5 [Agreed](#)  
Item 60 Substructure.....6 [Agreed](#)  
Item 61 Channel.....5 [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: [Great Comments](#)  
Defect Photos: [Good Defect Photos in Assetwise.](#)  
Channel Photos: [Acceptable](#)

### Inventory Items

Review of the bridge data showed **12** out of **142** bridges were missing comments when the rating was  $\leq 5$ . This requirement became effective Nov of 2020. **4** bridges should have Scour governing the substructure rating. SFNs: **4031230; 4030746; 4033469; 4031555**. And **2** of those bridges have a disparity of 2 or more change in points for scour. SFNs: **4031230, & 4030746**.

### Bridge Files: (metric 15)

**Jackson County** keeps files listed below as follows:

All of the following are kept in electronic format and paper format unless noted.

- Inspection reports, including old inspections
- Design Calculations
- Plans
- Load analysis calculations
- Inventory forms
- Photos and sketches
- Repairs and maintenance history
- Scour evaluation [N/A](#)
- Scour POA [N/A](#)
- Fracture Critical File
- Load Posting/Closing
- Underwater inspections [N/A](#)
- Special inspection eqpt. or procedures [N/A](#)
- Flood data, waterway adequacy, channel cross sections

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 **146 (100.00%)** of the County NBIS bridges have been Load Rated or Load Rating was not applicable. There are **14** NBIS bridges evaluated by documented engineering judgement using the BR100 form.

Load Ratings were checked for **SFNs 403302; 4032624** 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.

Four new bridges (twin pipe Culverts) need updated (Items 63 and 65 cannot be 0, if Items 64 & 66 are not is tons.) see errors message in columns AX and BB in the Load Rating TAB

JAC-C0016-0221\_(4030658)                      JAC-T0066-0010\_(4035152)  
JAC-T0067-0022\_(4033005)                      JAC-T0203-0052\_(4032528)

Six bridges had Oper. ratings equal to the Inv. rating. Column AM in the Load Rating Tab of Snapshot file.

JAC-T0215-0044\_(4040708)                      JAC-C0063-0246\_(4038398)  
JAC-C0063-0074\_(4038355)                      JAC-C0046-0304\_(4031431)  
JAC-C0039-0186\_(4037448)                      JAC-C0029-0655\_(4037081)

Four Bridges have the %legal load not tied to the lowest Load Rating Factor

JAC-T1008-0014\_(4033493)                      JAC-T0216-0081\_(4032633)  
JAC-T0291-0113\_(4032977)                      JAC-C0057-0202\_(4031725)

Three bridges do not have the Operating and Inventory rating in whole numbers.

JAC-T0203-0052\_(4032528)      JAC-T0973-0061\_(4031113)      JAC-T0517-0294\_(4035224)

*(NOTE: Many of the above errors have been resolved since the QAR Office review meeting.*

#### **Load Posting** (metric 14)

Jackson County has **32** 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.

The County has three bridge that are posted, but no posting date entered in Assetwise for sign installation.

JAC-C0057-0202\_(4031725)      JAC-T0317-0017\_(4033051)      JAC-T0340-0113\_(4033132)

There are 8 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

JAC-T0217-0005\_(4033469)                      JAC-T0298-0191\_(4033035)  
JAC-T0317-0017\_(4033051)                      JAC-T0190-0166\_(4035089)  
JAC-T0340-0113\_(4033132)                      JAC-T0180-0005\_(4032357)  
JAC-T0286-0063\_(4032942)                      JAC-T0180-0005\_(4032357)

There are three bridges rated 3 or less that are not closed.

JAC-T0203-0052\_(4032528)      JAC-T0067-0022\_(4033005)      JAC-C0016-0221\_(4030658)

**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 4032624**, was reviewed and the FCM's identified.

Gusset Plate calculations were satisfactory for **SFN 4032624**.

**Underwater Inspections and Scour: NA**

**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 **\$100,000.00** 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**.

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 Jackson County:**

- Metric 12      Scour Rating should control Substructure
- Metric 16      Supply FC Insp Procedure for each FC bridge ( I did not see one in the office files sent over
- Metrics 13&14    Correct data entry errors in Assetwise as indicated in report discussion above.