

**National Bridge Inspection Standards &  
 Bridge Maintenance Program Review  
 Meigs County  
 Oct 29, 2020**

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

**IN ATTENDANCE:**

Sara Walpole  
 Gene Triplett  
 Jason Popa  
 Jeff Peyton  
 Mark Stockman, CEAO Federal Bridge QA/QC Engineer

**SCOPE OF REVIEW:**

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

| <b>Asset Name</b>          | <b>TYPE</b> | <b>County Rating</b> | <b>Suggested NBIS Rating</b> |
|----------------------------|-------------|----------------------|------------------------------|
| MEG-C0018-02.788_(5331064) | Steel Beam  | 5A                   | SAME                         |
| MEG-C0003-13.293_(5341019) | Steel Beam  | 4A                   | SAME                         |
| MEG-T0052-00.684_(5341604) | Steel Beam  | 5A                   | SAME                         |
| MEG-T0054-00.567_(5341434) | Conc. Slab  | 5P                   | 4P                           |
| MEG-T0014-03.456_(5341728) | Conc. Slab  | 5A                   | SAME                         |
| MEG-T0013-00.505_(5333520) | Conc. Slab  | 4P                   | 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.

Meigs County has inspection responsibilities for 310 bridges, 144 of which are longer than 20 feet in length and 166 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**

Meigs County uses their own staff and a consultant to do the inspections. FC inspections are done by a consultant. Previous inspection reports are available at site for review. The previous year's inspection reports (paper) are brought out and changes are made in red. The changes are then made to the inspection reports online and submitted for review through SMS/AssetWise. Bridge comments are recorded on the previous year's inspection report and then input to AssetWise at the office. Bridge plans are carried to the bridge site for review if they are 11X17 or smaller. Larger Bridge plans are available at the Bridge Office, but not at the Bridge site. Photos are available for every bridge, and photos are taken of defects during inspection.

The County indicated that an average of 10-15 inspections per day were completed in 2020. It takes about 1 hour for Truss (pony/through/deck). It takes 40 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 for inspection.

A Team Leader is present at all inspections.

### **Frequency of Inspections**

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Meigs County had 144 NBIS 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 Team Leader or Engineer determines the need for a routine inspection frequency greater than once a year, based on inspections and history.

There are not any bridges that require inspections more frequently than one year.

**Qualification and Duties of Personnel**

Mr. Gene Triplett is the County Engineer and Program Manager. He is a PE and has 19 years of bridge inspection experience. He took comprehensive bridge training in 2008 and has a Legacy Clause checklist to document his experience prior to 2006. He took a Refresher in 2020. The Refresher and Legacy clause are approved and uploaded to AssetWise. He is qualified to be the Program Manager.

Ms. Sara Walpole is a Team Leader. She has 18 years of inspection related experience. She has the comprehensive classes (ODOT Level 1 &2) in 2008 and a Refresher in 2020. They are approved and uploaded to AssetWise. She is qualified to be a Team Leader

Mr. Jason Popa is a Team Leader and a PE. He has 24 years of inspection related experience. He has the comprehensive classes (ODOT Level 1 in 1992 and Level 2 in 2008, and a Refresher in 2017. He took the NHI two week comprehensive class in 2020. He has a Legacy Clause checklist uploaded to AssetWise. They are all approved and uploaded to AssetWise. He is qualified to be a Team Leader

**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**

**MEG-C0018-02.788 (5331064)**                      **Steel Beam**

Deck = ..... 6

Superstructure = .....6

Substructure = .....5

Channel = .....5

Scour = ..... 6

Culvert = .....N

Photos = ..... Abutment Photos = OK

Channel Photos = .....2 photos good

Comments= .....Structural crack on forward, - describe how big is crack?

**MEG-C0003-13.293 (5341019)**

**Steel Beam**

Deck = ..... 8

Superstructure = ..... 6

Substructure = ..... 4

Channel = ..... 5

Scour = ..... 4

Culvert = ..... N

Photos = ..... Good

Channel Photos = ..... 2 - Good

Comments= ..... Good

**MEG-T0052-00.684 (5341604)**

**Steel Beam**

Deck = ..... 6

Superstructure = ..... 6

Substructure = ..... 5

Channel = ..... 5

Scour = ..... 6

Culvert = ..... N

Photos = ..... Good

Channel Photos = .....Good

Comments= .....Good

**MEG-T0054-00.567 (5341434)**

**Conc slab**

Deck = .....6

Superstructure = .....6

Substructure = .....5 should be 4 based on comments about 2013 picture. (can probe up to 1/3 stone depth for more than half bridge width.)

**MASONRY – Condition Rating Definitions**

| 1-4 Indiv. | 9-0 Summary    | General  | Displacement   |
|------------|----------------|--|--|
| 1-Good     | 9-Excellent    | No signs of distress, Minor spalling of stone surface.   |  |
|            | 8-Very Good    | Scaling on of stone surface less than 1/2 inch.  |  |
|            | 7-Good         | Diagonal or vertical shear crack in isolated stones. Fracture of stone surface less than 2 inches.   |  |
| 2-Fair     | 6-Satisfactory | Diagonal or vertical shear crack through several courses of stone. Removable stone face for less than 1/2 of bridge width less than ¼ stone depth.   | Minor  |
|            | 5-Fair         | Diagonal or vertical shear crack through several courses of stone. Removable stone less than ¼ of stone depth for more than 1/2 of bridge  | Displacement may be bulge or leaning stones. Total displacement is less than 1/4 of stone depth. |
| 3-Poor     | 4-Poor         | Settlement causing diagonal or vertical shear crack through several courses of stone with displacement. Large fractures or erosion of stone surfaces up to 1/3 stone depth on several adjacent stones. | Total displacement is less than 1/3 of stone depth.  |
|            | 3-Serious      | Large unsound areas. Misalignment of mortar joints. Large fractures or erosion of stone surfaces greater than 1/3 stone depth.   | Several stones are displaced or missing.   |
|            | 2-Critical     | Numerous missing or displaced stones. Displacements greater than 1/3 of stone depth. Keying (vertical separation between   |  |

Channel = .....6

Scour = .....6 should be a 4 based on comments about scour left half of footer stones exposed full height? (left half of footer stones exposed full height)

**Substructure Scour, Spread or Unknown foundations – “ded” CONDITION RATING**

Item - **42. Scour**  
 Type - **Spread Footing on Soil OR Unknown Foundations**

| 1-4               | 9-0                | Description*   | Exposed <u>Spread or Unknown</u> Foundation*  |
|-------------------|--------------------|--|---|
| <b>1-Good</b>     | 9-Excellent        | No Problems noted.   |   |
|                   | 8-Very Good        | Minor scour holes developing, scour protection placed.   |   |
|                   | 7-Good             | Some minor problems. Minor scour holes exist; probing indicated soft material in scour hole.   | top of footing exposed  |
| <b>2-Fair</b>     | 6-Satisfactory     | Damage to scour countermeasures, probing indicates soft material in scour hole.  | Sides of footings exposed less than 6 inches.   |
|                   | 5-Fair             | Minor scour, damage to scour countermeasures, probing indicates soft material in scour hole.   | Unprotected footings along the vertical sides are exposed less than 12-inches high, corner of footing may have minor undermining. |
| <b>3-Poor</b>     | 4-Poor.            | Advanced scour.  | Unprotected vertical side of footing exposed, full height, less than 1/3 the horizontal length of the footing.                    |
|                   | 3-Serious          | Scour has seriously affected the primary structural components Local failures are possible.  | Undermining exposing the underside less than 1/3 the horizontal length of the footing.  |
| <b>4-Critical</b> | 2-Critical         | Scour may have removed substructure support. Local failures are possible. Any substructure unit with more than 20% of bearing capacity removed.  | Underside of footing exposed more than 1/3 the horizontal length of the footing.  |
|                   | 1-Imminent Failure | Obvious vertical or horizontal movement due to scour that is affecting the structure stability. Bridge is closed to traffic but corrective action may put bridge back in to light service. |   |

Culvert = .....N

Photos = .....GOOD

Channel Photos = ..... Good

Comments= .....Good

**MEG-T0014-03.456 (5341728)**

**Conc slab**

Deck = ..... 6

Superstructure = .....6

Substructure = .....5

Channel = .....6  
Scour = .....6  
Culvert = .....N  
Photos = .....Good  
Channel Photos = .....Good  
Comments= .....Good

**MEG-T0013-00.505 (5333520)**

**Conc slab**

Deck = .....7  
Superstructure = .....6  
Substructure = .....4  
Channel = .....4  
Scour = .....6  
Culvert = .....N  
Photos = .....Good  
Channel Photos = .....GOOD

Comments= ..... need description of deterioration, such as 10%-25% loss of stone face on several stones. Also – need amount of displacement

**Abutment Walls (LF)**

Areas of large stone deterioration, isolated cracks, displacement.  
Full height of footer exposed - abutment on rock both sides.

**Inventory Items**

Two bridges 5342198 and 5334039 were missing the FC and UW Y/N switch items 92A&B. This should be completed at the next inspection,

Review of the bridge data showed all bridges had comments in AssetWise when the rating was 5 or lower. This requirement became effective Nov of 2020.

## Files

Meigs County keeps files in the following locations:

- Inspection reports, including old inspections - Team Leader office in bridge file in bridge file cabinets
- Design Calculations – In bridge file
- Plans- In bridge file, larger plans in bridge file cabinet
- Load analysis calculations – In bridge file, FC calculations in bridge file cabinet
- Inventory forms – Online and Team leaders office
- Photos and sketches – in electronic bridge file
- Repairs and maintenance history – in bridge file
- Scour evaluation – bridge file
- Scour POA –bridge file
- Fracture Critical File – in bridge file and fracture critical file with load analysis
- Underwater inspections – n/a
- Special inspection eqpt. or procedures – in bridge manual
- Flood data, waterway adequacy, channel cross sections – in bridge file or electronic bridge file

## Load Rating

The inventory shows 202 (100.00%) of the County bridges have been Load Rated or Load Rating was not applicable. There were 30 NBIS bridges evaluated by documented engineering judgement.

Load Ratings were checked for SFNs 5332575, 5332842, 5332109, 5334632. 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.

## Load Posting

Meigs County has 54 NBIS bridges that are load posted. There are 0 bridges closed for condition ratings. Posting is based on Operating Rating. Gross Tonnage and Silhouette Signs are the type of sign used for load posting. The county is advised that as the Silhouette signs wear out and need replacing, that they should be replaced with the R12-H5 sign or successor to that sign.

## Special Features

There are 0 bridges with unique or special features.

## Fracture Critical Bridges

The FC bridge inspection frequency is 24 months..

SFN FC plans for 5332575 and SFN 5332842 were reviewed. They both had FCM's identified. Also, Fatigue Prone details were complete and the FC Inspection Procedure did contain Risk Factors.



Gusset Plate calculations were satisfactory for 5332575 and SFN 5332842.

### **Underwater Inspections and Scour**

Meigs 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 checked and updated during annual inspections. The county rotates inspections every few years between inspectors.

### **Critical Findings**

The county does have a Critical Findings Procedure in place (using the ODOT inspection manual). Inspectors inform and relay the information directly to the Engineer, Superintendent, Asst. Superintendent, Bridge Foreman, and/or the Eng. Technician. If a bridge requires emergency repairs, it is documented in AssetWise, in the bridge file, and in cost tracking software. Bridge inspectors check proper placement of signs.

### **Bridge Maintenance**

The County does contract bridge work as funding allows. The work is for replacement projects. The approximate annual budget is \$160,000 local funds. Fed Funds are used for bridge replacement through the CEAO LBR Program and Credit Bridge Funds are used for bridge replacement projects.

The county does force account bridge work and uses an in-house crew of 4. Typical work items include small structure replacement, stone repointing, rip rap channel protection and concrete aprons (skirts). The approximate budget is \$75,000 local funds.

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