

**National Bridge Inspection Standards &
Bridge Maintenance Program Review
Washington County
October 28, 2020**

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

IN ATTENDANCE:

Roger Wright
Kurt Zimmer
Tim January
Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

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

SFN	CTY-RTE-SECT	TYPE	County Rating	Suggested NBIS Rating
8436738	WAS-T1454-0072WR	Steel Beam	3A	same
8436797	WAS-T0282-0041WR	Concrete Slab	5A	same
8431647	WAS-C0002-0180BE	Steel Culvert	4A	same
8437440	WAS-T0289-0227BE	Concrete Slab	5A	same
8433119	WAS-C0006-0031DE	Prestressed Box Beam	5A	4A
8431760	WAS-C0111-0465DE	Steel Truss Pony	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.

Washington County has inspection responsibilities for 377 bridges, 213 of which are longer than 20 feet in length and 164 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

Washington 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 recorded both on field and electronically. They are recorded on a paper BR-86 and Excel Spreadsheet and then entered into Asset Wise at the office. In 2020, the County started using Asset Wise with an I-pad. Bridge comments are recorded on as a paper copy of BR-86, Laptop, and Asset Wise. Bridge plans are not carried to the bridge site for review, but are available at the Bridge Office. Photos are available for every bridge, and photos are taken of defects during inspection.

The County indicated that an average of 15-20 inspections per day were completed in 2020. It takes about 1-2 hours for Truss (pony/through/deck). It takes 0.5 – 1 hour for Beam/Girders. For a slab, it takes about 0.5 – 1 hour. For a Culvert, it takes about 0.5 – 1 hour.

The County has 2 bridges that require a snooper for inspection. A snooper performs a more in-depth inspection than normal visual inspection due to the size and height above stream making visual inspection challenging.

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Washington County had 369 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 Leaders determine the need for a routine inspection frequency greater than once a year, based on deterioration and type of material.

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

Qualification and Duties of Personnel

Mr. Roger Wright, PE. He is the Program Manager, a PE and has 20+ years of inspection related experience. ODOT Level 1 class was taken in 2001. The Grandfather Legacy Clause was completed and uploaded to AssetWise to document his experience as a Team Leader prior to 2006. The Refresher was in 2020. All are approved and uploaded to Asset Wise. He is qualified to be the Program Manager.

Mr. Tim January. He is a Team Leader and has 19+ years of inspection related experience post. ODOT Level 1 & 2 class was taken in 2001. The Grandfather Legacy Clause was completed and uploaded to AssetWise to document his experience as a Team Leader prior to 2006. The most recent Refreshers were in 2018 and 2020. All are approved and uploaded to Asset Wise. He is qualified to be a Team Leader.

Mr. Kurt Zimmer. He is a Team Leader and a PE and has had 3 years of inspection related experience. ODOT Level 1 & 2 class was taken in 2017. The Refresher was in 2020. All are approved and uploaded to Asset Wise. 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. Two bridges had a scour rating lower than the Substructure rating. The county was reminded that Scour controls the rating of Substructure or Culvert.

Field Review

WAS-T1454-0072WR_(8436738)
Callihan Road

Steel Beam

GA=3

Deck = 3

Superstructure = 4

Substructure = 3

Channel = 9

Scour = 7

Culvert = N

Photos = need better photos of piling to justify the rating of 4

Comments= Notes for Substructure and Superstructure are required to be in AW. Need to add quantities and/or measurements

WAS-T0282-0041WR_(8436797)

Conc Slab

GA=5

Deck = 8

Superstructure = 8

Substructure =5
 Channel =7
 Scour =7
 Culvert =N
 Photos = can be closer to show better – show spalling
 Comments= Need to add quantities and/or measurements of spalling depth, size, etc.

WAS-C0002-0180BE_(8431647)

Steel Culvert

GA=4

Braun Road

Deck =N
 Superstructure =N
 Substructure =N
 Channel =6
 Scour =6
 Culvert =4
 Photos = need better pix of perforations
 Comments= Need amount of perforations, such as 15%. Need length of scour

WAS-T0289-0227BE_(8437440)

Conc Slab

GA=5

Deck =5
 Superstructure =6
 Substructure =5
 Channel =7
 Scour =7
 Culvert =N
 Photos = doesn't show detail needed to see why it's a 5
 Comments= Need numbers for large spall area – loose concrete – need to support rating of 5

WAS-C0006-0031DE_(8433119)

Prestressed Box Beam

GA=5

Burnett Road

Deck =5
 Superstructure =5 - I would rate a 4 based on the drainage
 Substructure =6
 Channel =7
 Scour =7
 Culvert =N
 Photos = need better detail to show what's in the comments
 Channel photo wrong angle
 Comments= Need count of strands exposed, LES of spalling,

Deck = 6
Superstructure = 4
Substructure = 6
Channel = 7
Scour = 7
Culvert = N
Photos =
Channel Photos = a little too close -can't see both abutments
Comments= need better LES in section loss comments, you have some LES but not complete,

Inventory Items

During the Files review, it was concluded that the FC Files are okay. There is a slight improvement needed on the FC Inspection Procedure, that being to list any Risk Factors that are present on the bridge. See Metric 16 for a list of Risk Factors.

Files

Washington County keeps all files in the file room organized by County Route number low to high and log point of the structure and Township Route number low to high and log point of the structure with all applicable data above within the individual bridge file. Bridge load ratings and inspections are located in blue file folders, fracture critical information located in red file folders. Bridge plans are also filed within the bridge plan room where plans are available and in large size format.

Load Rating

The inventory shows 213 (100.00%) of the County bridges have been Load Rated or Load Rating was not applicable. There were 14 bridges evaluated by documented engineering judgement. BR100 forms are completed for all engineering judgment bridges.

Load Ratings were checked for SFNs 8431419, 8432031, 8431213, and 8432007. 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

Washington County has 25 NBIS bridges that are load posted. There are 6 bridges closed for condition rating. They use a mix of analysis and engineering judgement to determine. Posting is based on Operating Rating. R12-H5 is the type of sign used for load posting. Commissioners do a resolution to authorize the posting of a bridge.

Special Features

There are 0 bridges with unique or special features.

Fracture Critical Bridges

The FC bridge inspection frequency is 24 months. Washington County had SFN 8439451 and 8433682. They both had FCM's identified. Fatigue Prone details were also shown. FC inspection procedures were good except that they should include Risk Factors.

Gusset Plate calculations were checked for 8439451 and 8433682. They were satisfactory. The calculations showed that some of the joints failed a Minimum Edge Stiffness test and the meaning and possible actions were explained to the county.

Underwater Inspections and Scour

There are 7 bridges that require underwater inspections. The dive frequency is 60 months. 8430128 UW inspection report was reviewed and found satisfactory. Dive inspection frequency was listed, inspection procedure was done, and location of underwater elements was shown. Channel Photos were done correctly.

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. Both inspectors enter from different sides of the bridge, cross underneath and continue to inspect the entire structure and then compare comments. An outside consultant performs QA/QC inspections on random bridges with the County comparing previous inspection to consultant inspection. SMS Inventory Data exported and reports are created for review.

Critical Findings

The county does have a Critical Findings Procedure in place located in the SMS. Inspectors inform and relay the information directly to the field superintendent and the county engineer. This is done both through written comments during inspection are utilized to create a maintenance report, oral as needed and on site review as required. If a bridge requires emergency repairs and is found during a routine inspection, it is noted on the inspection report. If it is found by other means, a separate document is created. Bridge Inspection Team Leaders check proper placement of signs during annual inspection and the sign maintenance employee is provided a list yearly of all posted structures.

Bridge Maintenance

The County does contract bridge work as needed. The work includes Replacement, Deck Rehab/Replacement, and Painting. The approximate annual budget is \$500,000 to \$750,000. Fed Funds and Credit Bridge Funds are both used.

The county uses in-house staff that consists of typically a crew of 5 people. Typical work items include Steel Beam Repair, Concrete Repair, Waterproofing and Paving. The approximate budget is \$35,000.

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
12	need complete comments with LES on all ratings <=6
16	Supply Risk Factors in FC Insp Procedure for each FC bridge

Note: Bridge file needs to have the dive insp credentials in the file.