National Bridge Inspection Standards &
Bridge Maintenance Program Review
Holmes County
October 13, 2020

By: Mark Stockman, PE, PS
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IN ATTENDANCE:

Josh Galbraith
Steve Sommers
Mark Stockman, CEAO Federal Bridge QA/QC Engineer

SCOPE OF REVIEW:

The review consisted of interviews with Holmes County personnel, reviews of inspection and inventory data, and reviews of Holmes County bridge records. The office evaluation assessed Holmes 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 checked during the field review were:

SFN	CTY-RTE-SECT	TYPE	County Rating	Suggested NBIS Rating
3837165	HOL T0183 0244	Concrete Slab	5	same
3838250	HOL T0184 0249	Steel Beam	5	same
3830713	HOL C0019 0584	Steel Beam	4	same
3841642	HOL T0611 0050NN	Conc Culvert	5	same
3850250	HOL T0401 0339	Steel Culvert	5	same
3836541	HOL C0320 0564	Steel Truss	5	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.

Holmes County has inspection responsibilities for 282 bridges, 153 of which are longer than 20 feet in length and 129 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

Holmes County uses their own staff to do the inspections. Previous inspection reports are available at site for review. Bridge inspections are recorded in the field electronically using SMS on the laptop. Comments are recorded in the notes section in SMS or sheets in each bridge folder. They are brought to the bridge. Bridge plans are carried to the bridge site for review, except for full size/big plans. They can be remotely connected to if needed. Bridge plans are available on file 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 10 inspections per day were completed in 2020. Truss (pony/through/deck) takes 1-2 hours. It takes 0.5 – 1.5 hours for Beam/Girders. For a slab, it takes about 0.5 – 1.5 hours. For a Culvert, it takes about 0.5 hours.

The County does not have any bridges that require a snooper for inspection.

Comments were lacking for Channel ratings <6 and Scour rating was lower than the Substructure Rating on numerous bridges. The county was reminded that the Channel comments are needed and that the Scour Controls the Substructure and Culvert Summary Ratings.

Frequency of Inspections

Ohio State Transportation Laws require all State and local bridges to be inspected annually. Holmes County had 282 bridges inspected in 2019. The NBIS maximum inspection frequency of two years is met. All Bridges over 10 feet in length are inspected annually. The Program Manager and Team Leader have discussions to determine the need for a routine inspection frequency greater than once a year. There are not any bridges that requires inspection more frequently than one year.

Qualification and Duties of Personnel

Mr. Chris Young is the county engineer. As such he has overall responsibility for the bridge program. His is a PE. And has 14 years of inspection related experience. His most recent refresher is the NHI FC class in 2016. He has comprehensive classes in the 1990's.

Mr. Josh Galbraith is the Program Manager, and Reviewer. He is a PE and has 14 years of inspection related experience. His most recent refresher is the ODOT Bridge Refresher in 2020 and he took the NHI FC class in 2016. His comprehensive L1&2 classes were taken in 2009. All certifications are uploaded to AssetWise and approved.

Mr. Steve Sommers is a Team leader. He has had 14 years of inspection related experience and 7 years other bridge experience. His most recent refresher is the ODOT Bridge Refresher in 2020 and he took the NHI FC class in 2016. His comprehensive L1&2 classes were taken in 2009. All certifications are uploaded to AssetWise and approved.

Mr. Cory Baker is a Team Member. He took the comprehensive L1&2 classes in 2018. He has 2 years of experience. Refresher is not needed until 2023.

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.

Inventory Items

During the Files review, there were not any inventory items were identified and discussed with the county.

Files

Holmes County keeps all information and documents as follows. Inspection reports, including old inspections, are kept in the bridge files, scanned onto the server, and put into SMS. Design Calculations, Repairs and Maintenance History, Special inspection equipment or procedures and Flood data are all kept in Bridge Folders. Plans are kept in the Bridge Folder as well as in the office and on the server. Load analysis calculations are kept on field notes and in a summary in the bridge folder. Data and summary are kept on the server. Inventory Forms are kept in SMS. Photos and sketches are kept in the bridge folders and on the server. Scour evaluations are kept in the bridge folder if calculations are available. Fracture critical files are kept in the master file and also in the bridge folder. Flood data is kept in the bridge folder and with the plans.

Field Review

HOL-C0320-0564 _(3836541) **steel truss**

Ratings = Good

Comments = GOOD – update size of hole in web, has grown to 4” hole now.

Photos = GOOD

Channel Photos = GOOD

HOL-T0183-0244 _(3837165) **conc slab**

Ratings = Good

Comments = need measurements of % of spalling to show overall impact

Photos = NO PHOTOS FOR SUBSTRUCTURE in AW– Be sure they are in bridge file

Channel Photos = GOOD

HOL-T0184-0249 _(3838250) **steel beam**

Ratings = Good except Substructure = 5 ….should be 4 if backfill is coming through abutment

Comments = GOOD

Photos = NO PHOTOS FOR SUBSTRUCTURE in AW– Be sure they are in bridge file Channel Photos = GOOD

HOL-C0019-0584 _(3830713) **steel beam**

Ratings = Good, except Superstructure = 4 ….could be a 5, Substructure = 5 ….could be a 4

Comments = GOOD

Photos = NO PHOTOS FOR SUBSTRUCTURE in AW– Be sure they are in bridge file PICTURES FOR SUPER ARE GOOD

Channel Photos = GOOD

HOL-T0401-0339 _(3850250) **steel culvert**

Ratings = Good

Comments = GOOD – shape of culvert makes it a 5 need comments and LES about shape

Photos = NO PHOTOS FOR SUBSTRUCTURE in AW– Be sure they are in bridge file

Channel Photos = GOOD

HOL-T0611-0050NN_(3841642) conc culvert

Ratings = Good except that Culvert = 5 …..should be a 4 because advanced section loss (> 10% exposed steel)

Comments = GOOD

Photos = NO PHOTOS FOR SUBSTRUCTURE in AW– Be sure they are in bridge file

Channel Photos = GOOD

Load Rating

The inventory shows 283 (100.00%) of the County bridges have been Load Rated or Load Rating was not applicable. There were 20 bridges evaluated by documented engineering judgement.

Load Ratings were checked for SFNs 3836517, 3836517, 3841812, 3836541. 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

Holmes County has 23 NBIS bridges and 5 Non-NBIS bridges that are load posted. There are no bridges closed for condition ratings. They use a mix of engineering judgment and analysis. Large R12-H5 sign, plus a few silhouettes on non-NBI bridges (which will be phased out as time goes on) and Gross Tonnage sign on engineering judgement bridges are used for load posting.

Special Features

Holmes County does not have any bridges that have special features.

Fracture Critical Bridges

The FC bridge inspection frequency is 24 months. Holmes County had SFN 3843114 and SFN 3836541 reviewed. They both had FCM's identified. They both showed the Fatigue Prone details and had the procedure completed properly.

Underwater Inspections and Scour

There are 0 bridges require underwater inspections. There are 282 bridges over waterways considered scour susceptible and the probe is taken to every bridge for probing. There are 0 bridges that are scour critical.

QA/QC

The QA/QC section of the 2014 Bridge Inspection Manual meets the FHWA requirement. Quality Assurance checks are reviewed and done as a field review of structures with a GA of 4 or less. Inventory is looked over for problems when filling out inspection reports in SMS. Updated inventory data needs to be forwarded to ODOT within 180 days. The inventory data is input into SMS. It is then forwarded to ODOT immediately during inspection and on new construction, as soon as the project is complete. They alternate the team leader annually as well as have a 2-3 member inspection team.

Critical Findings

The county does have a Critical Findings Procedure in place located in the SMS. Maintenance problems are not identified on the bridge inspection form. They are documented on another form. Inspectors inform maintenance personnel of routine bridge maintenance problems orally. When emergency repairs or critical findings are necessary, bridge crew and/or sign department is notified by the bridge inspector. Crews are mobilized typically within 1 hour and then entered into SMS. The emergency action is documented immediately and is noted on maintenance forms and entered into SMS. If a bridge requires emergency repairs, it would be noted on the field inspection comments and work order. Inspectors verify correct limits are on signs and bridges. The sign technician takes care of everything else.

Bridge Maintenance

The County does contract bridge work as needed. The work includes replacement of bridges over force account limit through grants. The approximate budget is $0 - $400,000 of OPWC and LPA Funds. Funds and Credit Bridge Funds are used.

The county does force account bridge work using in-house staff that consists of a 3 man crew and others as needed. Typical work items include replacement of bridge with concrete boxes, galvanized multi-plate pipe, steel superstructure, precast concrete superstructure and concrete abutments, maintenance of structures, Rock Channel Protection. The approximate budget is $500,000.

Projects are identified and selected based on General Appraisal and Postings. Plans are developed for emergency repairs during site visits, engineering judgement, and design builds. Depending on the project, bridge crews or contractors are the ones who do the work of the emergency repairs. Repair work is documented on daily entry of time. Equipment and materials are entered into software daily. When there are emergency road closures, Chris Young, Josh Galbraith, Steve Sommers, Corey Baker, Jerry Galbraith, and Merle Yoder are all empowered to order the closures. One of the sign men are notified and closes it immediately. The person doing the closing waits to make sure traffic is not endangered until sign man

places barricades and signs. Sign man then notifies proper authorities (schools, emergency, radio, etc.)

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