

**National Bridge Inspection Standards &
Bridge Maintenance Program Review
Sandusky County
December 14, 2020**

By: Mark Stockman, PE, PS
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IN ATTENDANCE:

Carlos Baez
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SCOPE OF REVIEW:

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

Asset Name	TYPE	County Rating	Suggested NBIS Rating
SAN-C0057-0222 _(7242085)	Pres Conc Box Bm	5A	4A
SAN-T0209-0005 _(7230168)	Steel Thru Truss	4P	same
SAN-C0020-0515 _(7242298)	Conc Arch	5P	same
SAN-C0213-0067 _(7232152)	Pres Conc Box Bm	5A	same
SAN-C0181-338 _(7230176)	Pres Conc Box Bm	5A	same
SAN-T0278-0110 _(7246145)	Conc Culvert	5A	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.

Sandusky County has inspection responsibilities for 261 bridges, 177 of which are longer than 20 feet in length and 84 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

Sandusky County uses their own staff to do the inspections. Previous inspection reports are available at site for review. The previous year's inspection reports (paper) are brought out and changes are made on that form. The ratings are then made to the inspection reports online and submitted for review through AssetWise. Bridge comments are recorded in the inspection form and maintenance needs are put on a list. Bridge plans are available in the office. Photos are available for every bridge, and photos are taken (if needed) of defects during inspection.

The County indicated that an average of 10-12 inspections per day were completed in 2020. It takes about 60 minutes for Truss (pony/through/deck). It takes 30 minutes for Beam/Girders. For a slab, it takes about 15 minutes. For a Culvert, it takes about 15 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. Sandusky County had 261 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 not any bridges that require inspections more frequently than one year.

Qualification and Duties of Personnel

Mr. Carlos Baez Sr. is the County Engineer and Program Manager. He is a PE and has 20 years of bridge inspection experience. He took ODOT Level 1 bridge training in 2001 and has a Legacy Grandfather Clause checklist to document his experience prior to 2006. He took a Refresher in 2018. The Refresher and Legacy clause are approved and uploaded to AssetWise. He is qualified to be the Program Manager.

Mr. Rick Villarreal is a Team Leader. He has 21 years of inspection related experience. He has the comprehensive classes (ODOT Level 1 and Level 2) in 2006 and the ODOT Refresher in 2018. They are all approved and uploaded to AssetWise. He is qualified to be a Team Leader per note by Mike Brokaw

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

SAN-T0278-0110 (7246145)

Conc Culvert

Deck = N

Superstructure = N

Substructure = N

Channel = 5

Scour = 7

Culvert = 5

Photos = GOOD

Channel Photos = GOOD

Comments= **ADD LES. AREAS OF SATURATION SINCE SATURATION/WET CAN DRIVE A RATING**

SAN-C0213-0067 (7232152)

Pres Conc Box Bm

Deck = 5

Superstructure =5
Substructure =7
Channel =7
Scour =7
Culvert =N
Photos =Good
Channel Photos =Need to be better – bad angle , need overall perspective
Comments=GOOD, NEED TOTAL STRANDS IN BRIDGE TO DETERMINE PROPER RATING

SAN-C0057-0222 (7242085)

Pres Conc Box Bm

Deck =6
Superstructure =5 -
should be 4 based on 6 strands exposed (assuming bridge has between 15 and 24 strands original)
Substructure =7
Channel =7
Scour =6
Culvert =N
Photos =shows stirrups but need to see strands cracks
Channel Photos =need to be better – upstr and downstr as well
Comments=prestress strand count not clear enough, need maximum total strands in 1 beam
and number of exposed strands in each beam

SAN-T0209-0005 (7230168)

St Thru Truss

Deck =5
Superstructure =4
Substructure =7
Channel =6
Scour =6
Culvert =N
Photos =GOOD for Superstructure, Not Good for Deck
Channel Photos =Channel photos Not Good – looking away from bridge.. General Elevation photos
might have worked if they were closer – they are too far away
Comments=Deck comments Good – Superstructure comments need LES detail

SAN-C0020-0515 (7242298)

Conc Arch

Deck = N
 Superstructure = 5
 Substructure = 6
 Channel = 7
 Scour = 7
 Culvert = N
 Photos = Good
 Channel Photos = Need overall and additional photos of wall to show no channel banks are involved
 Comments= Need LES of spalls in Arch and spandrel walls

SAN-C0181-338 (7230176)

Pres Conc Box Bm

Deck = 6
 Superstructure = 5
 Substructure = 6
 Channel = 6
 Scour = 7
 Culvert = N
 Photos = Good
 Channel Photos = Good
 Comments= Not Good – not enough detail in Super comments to explain the rating – look to historical photos or area of gunite

Inventory Items

Review of the bridge data showed 9 out of 177 bridges had no comments when the rating was <=5, and review of the 6 bridges in the field showed all comments were missing sufficient detail with LES described in AssetWise when the rating was 5 or lower. This requirement became effective Nov of 2020.

Files

Sandusky County keeps files as follows:

- Inspection reports, including old inspections **Basement**
- Design Calculations **Basement**

- Plans **Basement and Scanned files**
- Load analysis calculations **Basement**
- Inventory forms **Basement**
- Photos and sketches **Basement and Computer Files**
- Repairs and maintenance history **Basement**
- Scour evaluation **Basement**
- Scour POA
- Fracture Critical File **Basement**
- Load Posting/Closing **Basement**
- Underwater inspections
- Special inspection eqpt. or procedures
- Flood data, waterway adequacy, channel cross sections **Basement or Drainage**

Files

Load Rating

The inventory shows 177 (100.00%) of the County NBIS bridges have been Load Rated or Load Rating was not applicable. There was 1 NBIS bridges evaluated by documented engineering judgement.

Load Ratings were checked for SFNs 7240430,7234228,vand 7240287. 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

Sandusky County has 16 NBIS bridges that are load posted. There are 0 bridges closed for condition ratings. Posting is based on Operating Rating. SHV R12-H5 signs are the type of sign used for load posting.

Special Features

There are 0 bridges with unique or special features.

Fracture Critical Bridges

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

FC plans for SFN 7234201and 7234228 were reviewed. They both had FCM's identified. The Complete FC plan is missing , Fatigue Prone Detail and FC Inspection Procedure will not meet FHWA approval. Also, inspection procedure including risk factors and access is missing. A single sentence to use a ladder to describe access is not sufficient to call it the inspection procedure. Use Inspection Manual **Appendix D & E** as guidelines to a complete FC plan.

Gusset Plate calculations were satisfactory for SFN 7234201and 7234228.

Underwater Inspections and Scour

Sandusky 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. Rick Villarreal inspects all 9, 8, and 7 bridges. Carlos Baez & Rick look at all 6 and lower bridges together.

Critical Findings

The county does have a Critical Findings Procedure in place (using the ODOT inspection manual). The County Engineer or Highway Superintendent handles emergency repairs.

Bridge Maintenance

The County does contract bridge work. The work is for Concrete Surface Repairs, Replacement (If Necessary), Paving or overlays. The approximate annual budget is approximately \$155,000. Fed Funds are sometimes used for bridge replacement and Credit Bridge Funds are not used for bridge projects.

The county does force account bridge work and uses highway maintenance crews as needed. Typical work items include Bridge Repairs, Replacement, Waterproofing/Sealing, Silt and Brush Removal, Power-washing Trusses, Guardrail Repairs. The approximate budget is \$450,000.

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	Scour Rating should control Substructure or Deck
16	Supply FPD and FC Insp Procedure for each FC bridge