

# Quality Assurance Review Bridge Inspection Program

The scope of this review is to evaluate the agency's bridge inspection program based upon The Ohio Revised Code, the ODOT Manual of Bridge Inspection (MBI), and the National Bridge Inspection Standards (NBIS). This includes the following checklist, interviews with staff members responsible for the inspection program, review of files and documentation, and field inspection of bridges. Note: the inspection program includes inventory, maintenance and load rating in addition to the field inspections.

**Instructions for completing form:** Please fill out checklist prior to scheduled review. Brief answers are desired; fill the items out to the best of your ability.

Agency Reviewed: Erie County Engineer's Office

Checklist completed by: Matt Rogers, P.E. Date: May 20, 2019

## ***I. MAINTENANCE, REHABILITATION AND REPLACEMENT PROGRAM***

### **A. NUMBER OF BRIDGES WITH MAINTENANCE RESPONSIBILITY**

1. Greater than 20' long (NBIS length 23CFR 650c) (Metric 22) **83**
2. Bridges  $\geq 10'$  and  $\leq 20'$  long (Metric 22) **55**

### **B. PROCEDURES AND BUDGET**

1. Contract repairs and replacement
  - List typical work items Structure replacement, superstructure replacement, concrete slab edge removal and replacement (longer spans), major guardrail/bridge rail repair and replacement, wearing surface removal and replacement
  - List approximate annual budget \$600,000
  - Are Fed Funds used? Once every 4 years
  - Are Credit Bridge funds used? Once every 4 years
2. In-house repairs and replacements
  - List typical work items Beam replacement (1 or 2 beams on a structure), concrete slab edge removal and replacement (shorter spans), tree and brush removal, concrete sealing, steel deck replacement, re-waterproofing/drainage/drip strip, concrete patching, minor guardrail and railing repair, scour repairs

- List approximate annual budget **\$25,000-\$50,000**
- List staffing availability **Crew of 3-4 available 4 months each year, or as needed**

3. How are projects identified and selected?

*ODOT general appraisal, estimated project cost, budget*

4. How are plans developed for emergency repairs?

*Office staff develop sketch plans for repairs in conversation with highway superintendent*

5. Who does the work of emergency repairs?

*Force account*

6. How is repair work documented? (i.e. work record, time card)

*Daily force account work reports, office staff time cards, supplemented by sketches, notes, and photos*

7. Who is empowered to order emergency road closures and how is it done?

*-County Engineer, County Sheriff, Highway Superintendent and Assistant Superintendent, either of own initiative or based on recommendation of staff engineers  
-Sign crew notified to place barricades and signs; affected government, public service, public safety agencies, and local media notified*

## **II. INSPECTION PROGRAM**(SMS Data will be utilized)

### **A. NUMBER OF BRIDGES WITH INSPECTION RESPONSIBILITY**

1. Greater than 20' long (NBIS length, ORC 5501.47, 5543.20) (Metric 22) **83**
2. Between 10' and 20' long (including 10' & 20') (ORC 5501.47, 5543.20) (Metric 22) **55**

### **B. STAFFING**

1. Name of individual who is the **Program Manager** (makes FINAL DECISION). List qualifications/yrs. experience (bridge inspection experience)

(Metric 1&2)

- Name: **Matt Rogers, P.E.**

- Yrs. Inspection related experience: **15 yrs.**

- List courses attended (& approx dates) **Bridge Inspection Basic (2001), Bridge Inspection Level 2 (2010), Bridge Inspection Manual Update (2011), SMS Training (2013), Bridge Inspection Refresher (2017)**

2. Name of individual in charge of bridge inspection unit (**Reviewer**). List qualifications/yrs. experience (bridge inspection experience)

(Metric 1)

- Name: **Matt Rogers, P.E.**
- Yrs. Inspection related experience: **15 yrs.**
- List courses attended (& approx dates) **Bridge Inspection Basic (2001), Bridge Inspection Level 2 (2010), Bridge Inspection Manual Update (2011), SMS Training (2013), Bridge Inspection Refresher (2017)**

3. **Team Leader** - individual in charge of bridge inspection team (INSPECTED BY). List qualifications/yrs. experience (bridge inspection experience)

(Metric 1&3)

- Name: **Mike Farrell, P.E.**
- Yrs. Inspection related experience: **8 yrs.**
- List courses attended (& approx dates) **Bridge Inspection Level 1 (2010), Bridge Inspection Level 2 (2010), Bridge Inspection Manual Update (2011), SMS Training (2013), Bridge Inspection Refresher (2017)**

- Indicate the percentage of time spent on the listed duties in the previous year

%TIME

<b><u>10</u></b> Bridge/Culvert inspection	<b><u>30</u></b> Surveying
<b><u>25</u></b> Bridge Design/Plan prep	<b><u>25</u></b> Other – Road Design/Inspection
<b><u>10</u></b> Bridge Construction	_____100%
<b><u>0</u></b> Bridge Maintenance	
<b><u>0</u></b> Overload/Superload	

4. **Team Leader** - individual in charge of bridge inspection team (INSPECTED BY). List qualifications/yrs. experience (bridge inspection experience)

(Metric 1&3)

- Name: **Matt Rogers, P.E.**
- Yrs. Inspection related experience: **See previous**
- List courses attended (& approx dates) **See previous**

- Indicate the percentage of time spent on the listed duties in the previous year

%TIME

<b><u>10</u></b> Bridge/Culvert inspection	<b><u>5</u></b> Overload/Superload
<b><u>30</u></b> Bridge Design/Plan prep	<b><u>5</u></b> Surveying
<b><u>25</u></b> Bridge Construction	<b><u>20</u></b> Other - Road Design/Inspection
<b><u>5</u></b> Bridge Maintenance	_____100%

5. [Deleted Team Leader]

6. [Deleted Team Leader]

7. **Team Member** of bridge inspection team (Include information for each additional team member – copy and paste as needed). List qualifications/yrs. experience (bridge inspection experience)

- Name: **Jeremy Blakely**

- Yrs. Inspection related experience: **9 yrs.**

- List courses attended (& approx dates) **Bridge Inspection Level 1 (2008)**

- Indicate the percentage of time spent on the listed duties in the previous year

%TIME

**10** Bridge/Culvert inspection

**10** Bridge Design/Plan prep

**0** Bridge Construction

**0** Bridge Maintenance

**0** Overload/Superload

**10** Surveying

**70** Other - Roadway design, drafting, safety reviews and training

\_\_\_\_\_100%

8. [Deleted Team Member]

9. [Deleted Team Member]

10. **Load Rating Engineer** – Name of individual responsible for load ratings (must be PE) (Metric 4) **Matt Rogers, P.E.**

a. List Ohio PE # **69680**

11. **Underwater Bridge Inspection Diver** – Name person doing dive inspections (Metric 5)

- Name: **ODOT-Prequalified Consultant**

- Yrs. Inspection related experience: **Varies**

- List courses attended (& approx dates) **Varies**

### C. INSPECTION EQUIPMENT

1. Type of vehicle used for inspections **Pickup truck with 4-wheel drive**

2. What typical inspection equipment does the inspection team normally carry with them to the inspection site?

	Yes/No	6' Folding Rule	<b><u>X</u></b>
Extension Ladder	<b><u>X</u></b>	100' Fiberglass Tape	<b><u>X</u></b>
what length?	<b><u>X</u></b>	Geologist Hammer	<b><u>X</u></b>

Inspection Mirror	___	Calipers	___
Flashlight	<u>X</u>	Shovel	___
Thermometer	___	Screw Driver	___
Plumb Bob	___	Pliers	___
Camera	<u>X</u>	Wrenches	___
2'-0" Level	<u>X</u>	Sounding Chains	___
Brush Hook/Axe	___	Hip Boots and Waders	<u>X</u>
Boat	___	Paint Stick/Crayon	<u>X</u>
		Scraper	___
First Aid Kit	<u>X</u>	Probing Rod	<u>X</u>
Wire Brush	___	Vertical Clearance Rod	___

3. List types of NDT methods used ( IE. dye penetrant, magnetic particle, ultrasound)  
**None**

4. How is usage determined?

**Equipment used is based on structure type, structure element distress/deterioration observed, topography.**

5. List additional items

**The items indicated above as not being typically carried by the inspection team are, with the exception of sounding chains, are available at the Engineer's Office should a specific inspection require their use.**

6. What equipment does your team have available for "hands on" access to FCM bridge members? (Metric 16)

**N/A – no fracture critical bridges**

7. Use of equipment (Metric 16)

a. How many bridges need a snooper? **None**

b. How many bridges is it used on? **None**

c. How often? **N/A**

## **D. INSPECTION PROCEDURES**

1. Approximately how many inspections were made during last calendar year? (Metric 6)  
**138**

2. Approximately how many inspections are scheduled for the current calendar year?  
(Metric 6) **138**

3. Average number of inspections per day (Metric 6) **15**

4. Approximately how long (hours) does it take to inspect average sized structures

a. Beam/Girder **0.25-0.50 hours**

- b. Slab 0.25-0.50 hours
- c. Truss (pony/through/deck) N/A
- d. Culvert 0.25-0.50 hours

5. Are previous inspection reports available at site for review? (Yes  No  )

(Metric 15)

Are bridge inspections recorded in field on paper or electronically? Please describe: Recorded on paper using previous year's inspection BR86 forms, then input into SMS at office.

Are photos available for every bridge? (Yes  No  )

Are photographs taken of defects during inspection? (Yes  No  )

Are Bridge comments recorded? (Yes  No  ) Where? Recorded on paper using previous year's inspection BR86 forms, then input into SMS at office.

Are bridge comments brought to the bridge? (Yes  No  )

6. Are the bridge plans carried to the bridge site for review if necessary or are they readily available for review in the bridge office? (Metric 15)

a. Bridge site (Yes  No  )

b. Bridge office (Yes  No  )

7. Who determines the need for a routine inspection frequency greater than once Annually, and what criteria is used? (Metric 6) Program manager, in consultation with team leader, based on observed condition of the bridge in conjunction with structure type, load rating, etc.

8. List bridges requiring inspection more frequently than one year intervals (DAMAGE, IN-DEPTH, SPECIAL INSPECTIONS). List frequency of inspection. (Metric 11)  
None

9. Does the inspection team believe it has enough time to do the job? (Yes  No  )

10. What kinds of quality assurance checks are made of the inspection process? (Metric 20)  
Reviewer independently rates a random selection of bridges without reference to the inspection team's data (i.e., using a blank BR86 form). Discrepancies, if any, are noted, and discussed with Team Leader.

11. Do any bridges have underwater inspections done in less than 60 month intervals? (Metric 8)  
No

12. Have all bridges requiring underwater inspections been inspected in 60 month intervals?  
(Metric 8) **Yes**

13. Do any bridges have fracture critical inspections done in less than 24 month intervals? (Metric 10) **N/A**

14. Have all bridges requiring fracture critical inspections been inspected in 24 month intervals?  
(Metric 10) **N/A**

15. Is a Team Leader at the bridge at all times during the following inspections? (Metric 12)

Initial Inspection? (Yes **X** No \_\_\_ )

Routine Annual Inspections? (Yes **X** No \_\_\_ )

In-Depth Inspections? (Yes **X** No \_\_\_ )

Underwater Inspections ? (Yes **X** No \_\_\_ ) (through consultant)

Fracture Critical Inspections? (Yes \_\_\_ No \_\_\_ ) (**N/A**)

## **E. SCOUR CRITICAL BRIDGES (Guidance in ODOT Manual of Bridge Inspection)**

1. How many bridges are considered scour susceptible? (Type of Service over Water)  
**138**

2. How many bridges are inspected by probing? **137**

3. How many structures are Scour Critical (item 74 - 3, 2, 1 or 0)? (Metric 18) **0**

4. Are Plans of Action (POA) complete and implemented for all bridges coded "Scour Critical"? (Metric 18) **N/A**

5. How many structures are coded 6 on item 74 Scour Critical? (Metric 18) **0**

6. How are scour evaluations performed? (Metric 18) **ODOT Scour Assessment forms are utilized. County Engineer's Office agrees to global scout statement and complete baseline photos and/or cross sections as required.**

7. Who determines the need for diving inspections and by what criteria?  
**Program manager, based on normal water depth and ability to visually/tactile inspect without diving.**

## F. INVENTORY

1. What kinds of inventory quality assurance checks are performed? (Metric 22)

**ODOT SMS error checking. Comparison of plan data versus SMS data. Review of inventory data during input of inspection data.**

2. How often is the inventory checked for needed updates? (Metric 22)

**Typically once a year during annual inspection data input.**

3. How is the inventory data input into the system?

**Through ODOT SMS.**

4. When is the updated inventory data forwarded to ODOT? (Metric 23)

Changes discovered during inspection?

**When inspection data is input in SMS**

Changes from new construction or rehab?

**Minor changes (i.e., changes that do not require new SFN, change the structure type, minor repairs, etc.) – when bridge inspection data is input following annual inspection**

**Major changes (new construction, change in structure type, anything requiring a new SFN) – following completion of construction**

5. NBIS requires that the inspecting organization maintain master lists of the following: (Provide a list of these bridges) (Metric 16,17,11)

a. Bridges that contain fracture critical members, including the location and description of such members on the bridge and the inspection procedures of such members (Each individual FCM member on each FCM bridge must be clearly identified in the bridge file) (Where a FCM Identification Plan exists then look for remaining fatigue life)

b. Bridges requiring underwater inspections

**SFN 2230186, Mason Rd bridge Mi-212 over Huron River**

c. Bridges with unique or special features (i.e., pin & hanger, draw, suspension)

**Note: An examination of the files will be performed during the review.**

- **Bridge Files**
- **Scour Critical POA**
- **Fracture Critical Plan**
- **UW inspection Procedure**



## G. PROCEDURES

1. Are new maintenance problems identified on the bridge inspection form? ( Y X N \_\_\_ ) On another form? (Yes \_\_\_ No X ) (Metric 15)
2. How do the inspectors inform maintenance personnel of routine bridge maintenance problems ( written, oral, other)? (Metric 15) Written list
3. Who do the inspectors notify when emergency repairs or critical findings are necessary (action required within 1 week)? (Metric 21) Highway superintendent or assistant highway superintendent

How is this emergency action documented? In writing following verbal notification

4. If a bridge requires emergency repairs, is this noted as part of the inspection report or as a separate document? (Metric 21) On inspection form
5. Who checks proper placement of signs (load posting, clearance, speed restriction, narrow bridge etc.)? (Metric 15) Inspection team during routine inspections

## H. LOAD ANALYSIS AND POSTING

1. Number of plans for existing bridges available for NBIS length bridges 79
2. Number of plans for non-NBIS bridges ( $\geq 10'$  and  $\leq 20'$  long) 41
3. Number of bridges analyzed in accordance with the *AASHTO Manual for Bridge Evaluation* (Metric 13) 137
4. By Whom (Metric 13) Matt Rogers, P.E.
5. When 2019
6. Methods used (Metric 13) ODOT in-house spreadsheets, AASHTO BrR, manual calculations, BRASS Culvert, engineering judgment
7. When are bridges re-rated and how do load raters keep up with overlays and other changes? (Metric 13) Changes noted on bridge inspection reports. Bridges re-rated based on changed conditions observed during inspections.
8. Number of NBIS length bridges not load rated (Metric 13) 0
9. List the NBIS length bridges considered “not ratable” including reason for being considered “not ratable” (Metric 13) 0

10. Number of NBIS length bridges load posted (Metric 14) 9
11. How determined (engineering judgment, analysis, mix) **Structural analysis**
12. List bridges closed due to condition rating (rough check) 0
13. List bridges rated less than 100% Ohio legal load and not physically load posted, and resolution 0
14. Number of NBIS bridges with Gusset Plates (Metric 13) 0
15. Number of NBIS bridges with Gusset Plates analyzed. (Metric 13) 0
16. Describe filing system (where files are kept): (Metric 15)

**Bridge files are divided up as follows:**

**Physical bridge files are in small front vault or in rear main vault. Some data is kept digitally on office computer servers.**

- Inspection reports, including old inspections **Files on network server. Older reports in main vault (>10 years).**
- Design Calculations **In physical bridge files (normally), on network server (some recent projects)**
- Plans **Files on network server, in physical bridge files, or in hanging plan racks**
- Load analysis calculations **Calculation files on server (most bridges), in physical bridge files (some)**
- Inventory forms **Inventory directly input and stored in SMS.**
- Photos and sketches **Jpeg files on server**
- Repairs and maintenance **history In physical bridge files or on network server, depending on age**
- Scour evaluation **Files on network server**
- Scour POA **Files on network server**
- Fracture Critical File **n/a**
- Load Posting/Closing **Files on network server**
- Underwater inspections **Files on network server**
- Special inspection eqpt. or procedures **Files on network server**
- Flood data, waterway adequacy, channel cross sections **Files on network server**

**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.

17. What is the FC bridge inspection frequency? (Metric 16) N/A
18. Is the FC Plan completed for all FC bridges? (Metric 16) (Yes \_\_\_ No \_\_\_) **N/A**

19. Are the FCM Identified in the FC Plan? (Metric 16) (Yes \_\_\_ No \_\_\_) **N/A**

20. What is the underwater inspection frequency? (Metric 17) **60 months**

21. Are the underwater elements identified and located? (Metric 17) (Yes **X** No \_\_\_)

22. List any complex bridges: (Metric 19) **N/A**

23. Do the complex bridges require specialized inspection procedures and additional inspector training? (Metric 19) (Yes \_\_\_ No \_\_\_) **N/A**

Describe: **N/A**

## **I. RECOMMENDED PRACTICES**

This area of the report should list any innovative ideas that provide valuable support and process improvement for offices across the State. For example: It creates a safer work environment, deploys resources efficiently, maximizes available resources, is measurable etc.