

# 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: Belmont County Engineer

Checklist completed by: Jason Popa and Daniel Boltz Date: June 18, 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) 165
2. Bridges  $\geq 10'$  and  $\leq 20'$  long (Metric 22) 111

### B. PROCEDURES AND BUDGET

#### 1. Contract repairs and replacement

- List typical work items new decks and stringers
  - List approximate annual budget \$100,000.00
  - Are Fed Funds used? rarely
  - Are Credit Bridge funds used? no
- reason? manpower to manage*
- are you aware of? yes - No time to go after it*

#### 2. In-house repairs and replacements

- List typical work items new decks, stringers, beams and abutment rehab
- List approximate annual budget \$400,000.00
- List staffing availability 6 full time employees

3. How are projects identified and selected? *By inspection reports and discussion with the bridge crew supervisor.*

4. How are plans developed for emergency repairs? *Discussion between County Engineer, Assistant Engineer, and Bridge Supervisor.*

5. Who does the work of emergency repairs? *Bridge Crew*
6. How is repair work documented? (i.e. work record, time card) *Time Cards*
7. Who is empowered to order emergency road closures and how is it done? *Primarily by County Engineer, but by road and bridge supervisors when necessary.*

**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) 165
2. Between 10' and 20' long (including 10' & 20') (ORC 5501.47, 5543.20) (Metric 22) 111

**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: Terry Lively PS PE
  - Yrs. Inspection related experience: See attached resume'
  - List courses attended (& approx dates) See attached resume'
- 
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2. Name of individual in charge of bridge inspection unit (**Reviewer**). List qualifications/yrs. experience (bridge inspection experience)  
(Metric 1)

- Name: Charles Jason Popa PE
  - Yrs. Inspection related experience: See attached resume'
  - List courses attended (& approx dates) See attached resume'
- 
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3. **Team Leader** - individual in charge of bridge inspection team (INSPECTED BY). List qualifications/yrs. experience (bridge inspection experience)

(Metric 1&3)

- Name: Charles Jason Popa
  - Yrs. Inspection related experience: see attached
  - List courses attended (& approx dates) see attached
- 
- 

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

%TIME

- |                                       |                         |
|---------------------------------------|-------------------------|
| <u>100</u> Bridge/Culvert inspection  | <u>      </u> Surveying |
| <u>      </u> Bridge Design/Plan prep | <u>      </u> Other -   |
| <u>      </u> Bridge Construction     | <u>100</u> 100%         |
| <u>      </u> Bridge Maintenance      |                         |
| <u>      </u> 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: \_\_\_\_\_
  - Yrs. Inspection related experience: \_\_\_\_\_
  - List courses attended (& approx dates) \_\_\_\_\_
- 
- 

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

%TIME

- |   |                                  |
|---|----------------------------------|
| <u>      </u> Bridge/Culvert inspection | <u>      </u> Overload/Superload |
| <u>      </u> Bridge Design/Plan prep   | <u>      </u> Surveying          |
| <u>      </u> Bridge Construction       | <u>      </u> Other -            |
| <u>      </u> Bridge Maintenance        | <u>      </u> 100%               |

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

(Metric 1&3)

- Name: \_\_\_\_\_
  - Yrs. Inspection related experience: \_\_\_\_\_
  - List courses attended (& approx dates) \_\_\_\_\_
- 
-

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

%TIME

_____ Bridge/Culvert inspection	_____ Overload/Superload
_____ Bridge Design/Plan prep	_____ Surveying
_____ Bridge Construction	_____ Other -
_____ Bridge Maintenance	_____ 100%

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

(Metric 1&3)

- Name: \_\_\_\_\_
  - Yrs. Inspection related experience: \_\_\_\_\_
  - List courses attended (& approx dates) \_\_\_\_\_
- 
- 

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

%TIME

_____ Bridge/Culvert inspection	_____ Overload/Superload
_____ Bridge Design/Plan prep	_____ Surveying
_____ Bridge Construction	_____ Other -
_____ Bridge Maintenance	_____ 100%

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: \_\_\_\_\_
  - Yrs. Inspection related experience: \_\_\_\_\_
  - List courses attended (& approx dates) \_\_\_\_\_
- 
- 

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

%TIME

\_\_\_\_\_ Bridge/Culvert inspection  
\_\_\_\_\_ Bridge Design/Plan prep  
\_\_\_\_\_ Bridge Construction  
\_\_\_\_\_ Bridge Maintenance

\_\_\_\_\_ Overload/Superload  
\_\_\_\_\_ Surveying  
\_\_\_\_\_ Other -  
\_\_\_\_\_ 100%

8. **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: \_\_\_\_\_  
- Yrs. Inspection related experience: \_\_\_\_\_  
- List courses attended (& approx dates) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

%TIME

\_\_\_\_\_ Bridge/Culvert inspection  
\_\_\_\_\_ Bridge Design/Plan prep  
\_\_\_\_\_ Bridge Construction  
\_\_\_\_\_ Bridge Maintenance

9. **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: \_\_\_\_\_  
- Yrs. Inspection related experience: \_\_\_\_\_  
- List courses attended (& approx dates) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

%TIME

\_\_\_\_\_ Bridge/Culvert inspection  
\_\_\_\_\_ Bridge Design/Plan prep  
\_\_\_\_\_ Bridge Construction  
\_\_\_\_\_ Bridge Maintenance

10. **Load Rating Engineer** – Name of individual responsible for load ratings (must be

PE) (Metric 4) *Charles Jason Popa and outside Consultants*

a. List Ohio PE #  Charles Jason Popa PE #60606

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

- Name:

N/A

- Yrs. Inspection related experience:

- List courses attended (& approx dates)

**C. INSPECTION EQUIPMENT**

1. Type of vehicle used for inspections. *2017 Chevrolet Silverado*

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

	Yes/No		
Extension Ladder	<u> Y </u>	First Aid Kit	<u> Y </u>
what length?	<u> 30' </u>	Wire Brush	<u> Y </u>
6' Folding Rule	<u> Y </u>	Calipers	<u> N </u>
100' Fiberglass Tape	<u> Y </u>	Shovel	<u> Y </u>
Geologist Hammer	<u> Y </u>	Screw Driver	<u> Y </u>
Inspection Mirror	<u> Y </u>	Pliers	<u> Y </u>
Flashlight	<u> Y </u>	Wrenches	<u> Y </u>
Thermometer	<u> Y </u>	Sounding Chains	<u> Y </u>
Plumb Bob	<u> Y </u>	Hip Boots and Waders	<u> Y </u>
Camera	<u> Y </u>	Paint Stick/Crayon	<u> Y </u>
2'-0" Level	<u> Y </u>	Scraper	<u> Y </u>
Brush Hook/Axe	<u> Y </u>	Probing Rod	<u> Y </u>
Boat	<u> Y </u>	Vertical Clearance Rod	<u> Y laser </u>

3. List types of NDT methods used ( IE. dye penetrant, magnetic particle, ultrasound)  
*Ultrasonic*

4. How is usage determined? *Field determination by team leader based on noted deterioration.*

5. List additional items

6. What equipment does your team have available for "hands on" access to FCM bridge members? (Metric 16) *Ladder (30'), climbing gear and cable supported scaffolding.*

7. Use of equipment (Metric 16)

- a. How many bridges need a snooper? *None*
- b. How many bridges is it used on? *N/A*
- c. How often? *N/A*

**D. INSPECTION PROCEDURES**

1. Approximately how many inspections were made during last calendar year? (Metric 6)  
 276

2. Approximately how many inspections are scheduled for the current calendar year?  
 (Metric 6)  
 276

3. Average number of inspections per day (Metric 6)  
 15-20

4. Approximately how long (hours) does it take to inspect average sized structures
- a. Beam/Girder 0.5
  - b. Slab 0.5
  - c. Truss (pony/through/deck) 1.0
  - d. Culvert 0.25

*10 recommended but OK if overall  
 Bridge program OK*

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: *The inspections are recorded in the field on paper using last year's inspection reports including all notes and photos.*

Are photos available for every bridge? (Yes  No  )

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

Are Bridge comments recorded? (Yes  No  ) Where? *On last year's report. Maintenance comments are also recorded at this time.*

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 and County Engineer based on deterioration and loading conditions.*

8. List bridges requiring inspection more frequently than one year intervals (DAMAGE, IN-DEPTH, SPECIAL INSPECTIONS). List frequency of inspection. (Metric 11)  
N/A

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

10. What kinds of quality assurance checks are made of the inspection process? (Metric 20)  
*Last year's inspection report is on site, all photos are available for viewing, the inspections are performed in the same manner for every bridge. The inspections are reviewed at a separate time when the data is entered into SMS for review and they are reviewed again at a separate time when the data is final reviewed.*

11. Do any bridges have underwater inspections done in less than 60 month intervals? (Metric 8)  
N/A

12. Have all bridges requiring underwater inspections been inspected in 60 month intervals?  
(Metric 8)  
N/A

13. Do any bridges have fracture critical inspections done in less than 24 month intervals? (Metric 10)  
No

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

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 \_\_\_ No \_\_\_)

Fracture Critical Inspections? (Yes X No \_\_\_)

*Nothing to write in report here*  
**N/A OK**

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

1. How many bridges are considered scour susceptible? (Type of Service over Water)  
276



2. How many bridges are inspected by probing? 35%
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) *Evaluations made by field inspection personnel*
7. Who determines the need for diving inspections and by what criteria? *Program Manager and County Engineer based on field conditions.*

## F. INVENTORY

1. What kinds of inventory quality assurance checks are performed? (Metric 22)  
*The bridge inventory is reviewed regularly in the office for completeness and correctness. Changes to inventory items are noted at the time of inspection. The error checking in SMS is used as well.*
2. How often is the inventory checked for needed updates? (Metric 22)  
*Annually*
3. How is the inventory data input into the system?  
*By inspector at the time of inspection data entry.*
4. When is the updated inventory data forwarded to ODOT? (Metric 23)  
*At the end of the inspection cycle*  
Changes discovered during inspection? OK  
*At the time of inspection data entry*  
Changes from new construction or rehab?  
*Once the old bridge has been taken out of service*
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 N/A
  - c. Bridges with unique or special features (i.e., pin & hanger, draw, suspension) N/A

**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 \_\_\_ ) (Metric 15)
2. How do the inspectors inform maintenance personnel of routine bridge maintenance problems ( written, oral, other)? (Metric 15) *Written in the inspection reports*
3. Who do the inspectors notify when emergency repairs or critical findings are necessary (action required within 1 week)? (Metric 21) *Terry Lively County Engineer*

How is this emergency action documented? *See attached Critical Findings Procedure*

*also, ~~use~~ SMS Critical Findings Report*

4. If a bridge requires emergency repairs, is this noted as part of the inspection report or as a separate document? (Metric 21) *Written in inspection report with follow up documented separately.*
5. Who checks proper placement of signs (load posting, clearance, speed restriction, narrow bridge etc.)? (Metric 15) *Inspectors*

## H. LOAD ANALYSIS AND POSTING

1. Number of plans for existing bridges available for NBIS length bridges
2. Number of plans for non-NBIS bridges ( $\geq 10'$  and  $\leq 20'$  long)
3. Number of bridges analyzed in accordance with the *AASHTO Manual for Bridge Evaluation* (Metric 13) *276*
4. By Whom (Metric 13) *Some by County Engineer, some by Contracted Consultant*
5. When - *for new SHV/EV loading, member deterioration or change in dead load*
6. Methods used (Metric 13) *AASHTOWare BrR, ODOT spread sheets, BRASS, BARS or assigned rating*
7. When are bridges rerated and how do load raters keep up with overlays and other changes? (Metric 13) *Bridges are rerated when the dead load changes (repaved, new guard rail,*

new deck, etc.), when the general appraisal is lowered from a 5 to a 4, or extreme deterioration is noted. Raters are notified by the field inspectors and also county personnel of changes.

8. Number of NBIS length bridges not load rated (Metric 13) *None*

9. List the NBIS length bridges considered "not ratable" including reason for being considered "not ratable" (Metric 13) *None*

*New Criteria  
handed to county*

10. Number of NBIS length bridges load posted (Metric 14) *27*

11. How determined (engineering judgment, analysis, mix) *Mix*

12. List bridges closed due to condition rating (rough check) *None*

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) *10*

15. Number of NBIS bridges with Gusset Plates analyzed. (Metric 13) *10*

16. Describe filing system (where files are kept): (Metric 15)

- Inspection reports, including old inspections
- Design Calculations
- Plans
- Load analysis calculations
- Inventory forms
- Photos and sketches
- Repairs and maintenance history
- Scour evaluation
- Scour POA
- Fracture Critical File
- Load Posting/Closing
- Underwater inspections
- Special inspection eqpt. or procedures
- Flood data, waterway adequacy, channel cross sections

**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) *24 months*

18. Is the FC Plan completed for all FC bridges? (Metric 16) (Yes *X* No     )

19. Are the FCM Identified in the FC Plan? (Metric 16) (Yes  No )

20. What is the underwater inspection frequency? (Metric 17) *N/A*

21. Are the underwater elements identified and located? (Metric 17) (Yes  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 )

Describe:

## **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.