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: Crawford County Engineer's Office

Checklist completed by: Bryan Waines Date: 9/5/2019

I. MAINTENANCE, REHABILITATION AND REPLACEMENT PROGRAM

A. NUMBER OF BRIDGES WITH MAINTENANCE RESPONSIBILITY

1. Greater than 20' long (NBIS length 23CFR 650c) (Metric 22) 126

2. Bridges >= 10' and <= 20' long (Metric 22) 69

B. PROCEDURES AND BUDGET

1. Contract repairs and replacement
   - List typical work items Total replacements, rehabilitations
   - List approximate annual budget $400,000
   - Are Fed Funds used? Yes
   - Are Credit Bridge funds used? Yes

2. In-house repairs and replacements
   - List typical work items Removals / box culvert installations
   - List approximate annual budget $150,000
   - List staffing availability As needed

3. How are projects identified and selected? Conditions observed during inspections

4. How are plans developed for emergency repairs? In-house or consultant, depending on severity

5. Who does the work of emergency repairs? In-house or contractor, depending on severity

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

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

County Engineer, bridge inspectors, highway superintendent - discussion and concurrence among staff and notification of law/fire

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)** 126

2. Between 10' and 20' long (including 10' & 20') (ORC 5501.47, 5543.20) **(Metric 22)** 69

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: Mark Baker
- Yrs. Inspection related experience: 15
- List courses attended (& approx dates) Comprehensive Bridge Inspection Program - ODOT - Spring 2009; Load Rating with BARS-PC - 10/2/2008; SMS Training - Feb. 2013; Inspection Refresher - 5/10/2017

2. Name of individual in charge of bridge inspection unit (**Reviewer**). List qualifications/yrs. experience (bridge inspection experience)
(Metric 1)

- Name: Mark Baker
- Yrs. Inspection related experience: 15
- List courses attended (& approx dates) (SEE ABOVE)

3. **Team Leader** - individual in charge of bridge inspection team (INSPECTED BY). List qualifications/yrs. experience (bridge inspection experience)
(Metric 1&3)

- Name: Jason Long

- Yrs. Inspection related experience: 18
- List courses attended (& approx dates) Comprehensive Bridge Inspection Program - Autumn 2001; Scour Assmt. Training - 7/31/2008; Load Rating with BARS-PC - 10/2/2008; Inspection Refresher - 5/10/2017

OK

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

%TIME

20	Bridge/Culvert inspection	20	Surveying
20	Bridge Design/Plan prep		Other -
20	Bridge Construction		100%
20	Bridge Maintenance		
0	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: Bryan Waines
- Yrs. Inspection related experience: 5
- List courses attended (& approx dates) Comprehensive Bridge Inspection Program - ODOT - Autumn 2016; E.I. Certification - Jan. 2017

OK Refresher in 2021

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

%TIME

30	Bridge/Culvert inspection	10	Overload/Superload
40	Bridge Design/Plan prep	10	Surveying
5	Bridge Construction		Other -
5	Bridge Maintenance		100%

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

(Metric 1&3)

- Name: N/A
- 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%

6. **Team Leader** - individual in charge of bridge inspection team (INSPECTED BY). List qualifications/yrs. experience (bridge inspection experience)
(Metric 1&3)

- Name: N/A
- 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%

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: N/A
- 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: N/A
- 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: N/A
- 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)

a. List Ohio PE # 66685

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 Pickup truck with utility bed

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

	Yes/No		
Extension Ladder	Yes	First Aid Kit	Yes
what length?	24'	Wire Brush	Yes
6' Folding Rule	Yes	Calipers	No
100' Fiberglass Tape	Yes	Shovel	Yes
Geologist Hammer	Yes	Screw Driver	Yes
Inspection Mirror	Yes	Pliers	Yes
Flashlight	Yes	Wrenches	Yes
Thermometer	No	Sounding Chains	Yes
Plumb Bob	No	Hip Boots and Waders	Yes
Camera	Yes	Paint Stick/Crayon	Yes
2'-0" Level	No	Scraper	Yes
Brush Hook/Axe	Yes	Probing Rod	Yes
Boat	No	Vertical Clearance Rod	No

3. List types of NDT methods used (IE. dye penetrant, magnetic particle, ultrasound)
   None
4. How is usage determined?
   Evidence of section loss
5. List additional items
   None
6. What equipment does your team have available for "hands on" access to FCM bridge members? (Metric 16) Ladders

7. Use of equipment (Metric 16)
   a. How many bridges need a snooper? None
   b. How many bridges is it used on?
   c. How often?

D. INSPECTION PROCEDURES

1. Approximately how many inspections were made during last calendar year? (Metric 6)
   195
2. Approximately how many inspections are scheduled for the current calendar year? (Metric 6)
   195
3. Average number of inspections per day (Metric 6) 20 (10 per day per inspector) - maximum
4. Approximately how long (hours) does it take to inspect average sized structures

   a. Beam/Girder 0.5 hours
   b. Slab 0.5 hours
   c. Truss (pony/through/deck) 0.5 hours
   d. Culvert 0.25 hours

5. Are previous inspection reports available at site for review? (Yes _X_ No ___) (Metric 15)

   Are bridge inspections recorded in field on paper or electronically? Please describe: Electronically - entered into SMS via laptop / Wi-Fi hotspot at bridge site

   Are photos available for every bridge? (Yes _X_ No ___)

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

   Are Bridge comments recorded? (Yes _X_ No ___) Where? SMS

   Are bridge comments brought to the bridge? (Yes _X_ 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 _X_)

   b. Bridge office (Yes _X_ No ___)

7. Who determines the need for a routine inspection frequency greater than once Annually, and what criteria is used? (Metric 6)
   Inspectors and County Engineer - for bridges with rapidly changing / worsening defects that are not critical but could become critical
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 _X_ No ___)

10. What kinds of quality assurance checks are made of the inspection process? (Metric 20)

Two inspectors who alternate bridges annually (County is split between inspectors)

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) 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) 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 ___)

Fracture Critical Inspections? (Yes X No ___)

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

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

194 (of total 195)

2. How many bridges are inspected by probing?

None

3. How many structures are Scour Critical (item 113 - 3, 2, 1 or 0)? (Metric 18)

None

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 113 Scour Critical? (Metric 18)

None

6. How are scour evaluations performed? (Metric 18)

Plan / flood data reviews, visual inspection, probing

7. Who determines the need for diving inspections and by what criteria?

Inspectors, based on substructure accessibility with walking/waders (no diving required at any Crawford County bridges)

F. INVENTORY

1. What kinds of inventory quality assurance checks are performed? (Metric 22)
   Inventory data is checked during inspection and periodically audited by CEAO QA/QC.
2. How often is the inventory checked for needed updates? (Metric 22)
   During inspection and whenever bridge features change.
3. How is the inventory data input into the system?
   Entered into SMS.
4. When is the updated inventory data forwarded to ODOT? (Metric 23) < 180 days
   As soon as entered into SMS.
   Changes discovered during inspection? As soon as inspection report is entered.
   Changes from new construction or rehab? As soon as construction is completed.

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) DAL-T0033-0011 (1738208), TEX-T0103-0099 (1743910), TEX-T0104-0052 (1743961) [all closed]
   b. Bridges requiring underwater inspections None

   c. Bridges with unique or special features (i.e., pin & hanger, draw, suspension) None

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___N_X_) On another form? (Yes _X_ No ___) (Metric 15)

2. How do the inspectors inform maintenance personnel of routine bridge maintenance problems (written, oral, other)? (Metric 15)
   Written / oral

3. Who do the inspectors notify when emergency repairs or critical findings are necessary (action required within 1 week)? (Metric 21)

County Engineer, highway superintendent

SMS Crit. Findings Report

How is this emergency action documented?

Inspection report, narrative in bridge file

4. If a bridge requires emergency repairs, is this noted as part of the inspection report or as a separate document? (Metric 21)

Both

5. Who checks proper placement of signs (load posting, clearance, speed restriction, narrow bridge etc.)? (Metric 15)

Bridge inspectors

H. LOAD ANALYSIS AND POSTING

1. Number of plans for existing bridges available for NBIS length bridges 120

2. Number of plans for non-NBIS bridges (>= 10' and <= 20' long)

Unknown, because non-NBIS bridges have not been analyzed

3. Number of bridges analyzed in accordance with the *AASHTO Manual for Bridge Evaluation* (Metric 13) 120

4. By Whom (Metric 13) Mark Baker, Bryan Waines - Crawford County Staff
Richland Engineering Ltd. - Consultant

5. When (most done by County)

2009-present, as needed

6. Methods used (Metric 13)

BARS-PC, AASHTO BrR, Spreadsheets

7. When are bridges rerated and how do load raters keep up with overlays and other changes? (Metric 13) Whenever bridge features change

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) Several rated with engineering judgement due to lack of plans

10. Number of NBIS length bridges load posted (Metric 14) 4

11. How determined (engineering judgment, analysis, mix) Analysis

12. List bridges closed due to condition rating (rough check) 3

13. List bridges rated less than 100% Ohio legal load and not physically load posted, and resolution None

14. Number of NBIS bridges with Gusset Plates (Metric 13)

3 (all closed)

15. Number of NBIS bridges with Gusset Plates analyzed. (Metric 13) None

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

All bridge plans and construction documents kept in file room in office. Each bridge has a file. Inspection reports kept in file cabinet in Jason's office. Load rating files (one per bridge) kept in office file cabinet located in common area. Scour critical and fracture critical master lists posted in file room. Load posting information kept in bridge load rating file for corresponding bridge. Maintenance history kept in main bridge file in file room, along with any photos.

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) Every 24 months if required (N/A to Crawford County as all FC bridges are permanently closed)

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)

N/A

21. Are the underwater elements identified and located? (Metric 17) (Yes ___ No ___)

N/A

22. List any complex bridges: (Metric 19) None

23. Do the complex bridges require specialized inspection procedures and additional inspector training? (Metric 19) (Yes ___ No ___)

N/A

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.