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: **Ross County**

Checklist completed by: **Deric Cox** Date: **May 28, 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):** **223**

2. Bridges >= 10' and <= 20' long **(Metric 22):** **208**

B. PROCEDURES AND BUDGET

1. Contract repairs and replacement
   - List typical work items: **Any work over the Force Account limit**
   - List approximate annual budget: **Average $200,000.00**
   - Are Fed Funds used? **Yes, when available**
   - Are Credit Bridge funds used? **Yes, when available**

2. In-house repairs and replacements
   - List typical work items: **Repair deficient beams; remove deficient decks and replace with concrete, prestressed or steel beams**
   - List approximate annual budget: **$ 250,000.00**
   - List staffing availability: **Bridge Foreman, Bridge Worker, Equipment Operator, Highway Worker, Engineering Support.**

3. How are projects identified and selected? **Load limit restrictions, structure ratings, budget**

4. How are plans developed for emergency repairs? **In house**

5. Who does the work of emergency repairs? **In house crews**

6. How is repair work documented? **Daily Log Sheets, completed Work Orders**

7. Who is empowered to order emergency road closures and how is it done? **County Engineer or designee. County crews perform closure, County Sheriff is notified, who then alerts other authorities.**

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):** 243

2. Between 10' and 20' long (including 10' & 20') (ORC 5501.47, 5543.20) **(Metric 22):** 211

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: **Deric Cox, P.E.**
- Yrs. Inspection related experience: **16**
- List courses attended (& approx. dates): **Bridge Insp. Level 1, May, 2011**
  Bridge Insp. Level 2, June, 2011
  Bridge Insp. Refresher, April, 2017

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

- Name: **John Wetzel, P.E., P.S.**
- Yrs. Inspection related experience: **11**
- List courses attended (& approx dates): **Bridge Insp. Level 1, May, 2011**
  Bridge Insp. Level 2, June, 2011
  Element Level Bridge Insp. Training, 2016

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

(Metric 1&3)

- Name: **Paul Cottrill**
- Yrs. Inspection related experience: **33**
- List courses attended (& approx. dates): **Level 1 or 2 or both in the following years: 1987, 1989, 1991, 1993, 1995, 1997, 1998, 2005, 2008, 2011. Element Level Bridge Insp. Training, 2016.**

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

%TIME

_50__ Bridge/Culvert inspection	_____ Surveying
_____ Bridge Design/Plan prep	_50__ Other -
_____ Bridge Construction	_____100%
_____ Bridge Maintenance	
_____ 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

_____ Bridge/Culvert inspection	_____ Overload/Superload
_____ Bridge Design/Plan prep	_____ Surveying
_____ Bridge Construction	_____ Other -
_____ 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: _____
- 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: _____
- 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: _____
- 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)**: **John Wetzel, P.E. #69233**
Deric Cox, P.E. #68092

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

- Name: **Done by Consultant; Integrity Aquatic**
- Yrs. Inspection related experience: _____
- List courses attended (& approx dates) _____
_____

C. INSPECTION EQUIPMENT

1. Type of vehicle used for inspections: **Pickup Truck**

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

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

3. List types of NDT methods used (I.E. dye penetrant, magnetic particle, ultrasound)
None used
4. How is usage determined?

5. List additional items

6. What equipment does your team have available for "hands on" access to FCM bridge members? **(Metric 16)**: **Ladders, bucket truck**

7. Use of equipment **(Metric 16)**
   a. How many bridges need a snooper? **12**
   b. How many bridges is it used on? **12 when possible**
   c. How often? **2 to 5 years**

D. INSPECTION PROCEDURES

1. Approximately how many inspections were made during last calendar year? **(Metric 6)**
454
2. Approximately how many inspections are scheduled for the current calendar year? **(Metric 6):** 454

3. Average number of inspections per day **(Metric 6): 8**

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

a. Beam/Girder **1 hour**
b. Slab **0.5 hour**
c. Truss (pony/through/deck) **1 hour**
d. Culvert **0.5 hour**

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: **On paper in the field and then transferred to computer in the office.**
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? **On inspection forms and in 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): Team Leader along with Bridge Staff and County Engineer. Low condition rating or critical finding.**

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

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)**

Some of the inspections are performed by other members of the team every year. Refresher Training when required. Review of the Inspection Forms.

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)** **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 ___) **If notified by Consultant**

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)

None

2. How many bridges are inspected by probing?

Only probed if visual inspection warrants.

3. How many structures are Scour Critical (item 74 - 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 74 Scour Critical? **(Metric 18)**

None

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

Visually

7. Who determines the need for diving inspections and by what criteria?
Team Leader if there is a Critical Finding.

F. INVENTORY

1. What kinds of inventory quality assurance checks are performed? **(Metric 22)**
Inventory checked along with the inspection process.
2. How often is the inventory checked for needed updates? **(Metric 22)**
Yearly, along with the inspection process.
3. How is the inventory data input into the system?
SMS
4. When is the updated inventory data forwarded to ODOT? **(Metric 23)**

Changes discovered during inspection? **When inspections are submitted.**

Changes from new construction or rehab? **Within 180 days.**

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). **List attached.**

b. Bridges requiring underwater inspections: **3 bridges over Scioto River:**
C-206-0003, C-238-0020, C-278-0119

c. Bridges with unique or special features (i.e., pin & hanger, draw, suspension)
One bridge with pin & hanger connections: C-238-0020

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) **Pictures, work order**

2. How do the inspectors inform maintenance personnel of routine bridge maintenance problems (written, oral, other)? (Metric 15): **Oral, pictures, work orders**

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

How is this emergency action documented? **Work Orders**

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

5. Who checks proper placement of signs (load posting, clearance, speed restriction, narrow bridge etc.)? (Metric 15): **Inspector and Sign Crew**

H. LOAD ANALYSIS AND POSTING

1. Number of plans for existing bridges available for NBIS length bridges: **204**

2. Number of plans for non-NBIS bridges (>= 10' and <= 20' long)
Not determined at this time.

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

4. By Whom (Metric 13): **John Wetzel, Deric Cox, Consultants**

5. When: **Most within the past 10 years.**

6. Methods used (Metric 13): **BARS, ODOT Spread Sheets, learning BrR**

7. When are bridges rerated and how do load raters keep up with overlays and other changes? (Metric 13): **When bridge conditions change or deteriorate to warrant new rating. Yearly inspections and refer to yearly paving program.**

8. Number of NBIS length bridges not load rated (Metric 13): **15**

9. List the NBIS length bridges considered "not ratable" including reason for being considered "not ratable" (Metric 13): **List attached. These bridges have no plans available and cannot determine beam or reinforcing steel size and quantity.**

10. Number of NBIS length bridges load posted (Metric 14): **9**

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

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: **None**

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

15. Number of NBIS bridges with Gusset Plates analyzed. **(Metric 13)**: **14**

16. Describe filing system (where files are kept): **(Metric 15)** **All bridge files are kept in filing cabinets in a central room in our office and filed by the bridge number. A file in the first drawer contains lists such as fracture critical list, bridges posted list, vertical clearances, etc. There is a separate drawer that contains some of the load rating reports that are too large to fit with the bridge files. These are referenced in the corresponding bridge files. All Inventory forms are kept together in bindings in the same room.**

- 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 **_X_** No ___)

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)**

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.