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: LUCAS COUNTY

Checklist completed by: Bryan Zienta, P.E. Date: August 7, 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)**
   120
2. Bridges >= 10' and <= 20' long **(Metric 22)**
   75

B. PROCEDURES AND BUDGET

1. Contract repairs and replacement
   - List typical work items: Painting, Replacement, Wearing Surface Replacement, Pier Encasement,etc..
   - List approximate annual budget: $645K
   - Are Fed Funds used? Yes
   - Are Credit Bridge funds used? Yes

2. In-house repairs and replacements
   - List typical work items: Deck Cleaning, Pothole Repair, Guardrail Repair, Embankment Slip Repair, Crack Sealing, etc..
   - List approximate annual budget: $11K
   - List staffing availability: Various County Maintenance Personnel

3. How are projects identified and selected? From previous year's bridge inspections, what funding is available and what nearby projects are scheduled.

4. How are plans developed for emergency repairs? Plans are prepared in house when needed or a simple work order is prepared.

5. Who does the work of emergency repairs? County Maintenance Personnel

6. How is repair work documented? (i.e. work record, time card) Work order or by contract documents

7. Who is empowered to order emergency road closures and how is it done? For bridges - The Bridge Engineer, County Engineer or Deputy County Engineer. It is then followed up with a resolution by the County Commissioners.

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)**
   120
2. Between 10' and 20' long (including 10' & 20') (ORC 5501.47, 5543.20) **(Metric 22)**
   75

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: Bryan Zienta, P.E.
- Yrs. Inspection related experience: 26-years+
- List courses attended (& approx. dates): Bridge Inspection Course, 1995: Bridge Inspection Course, Level 1 & Level 2, 2008; Bridge Inspection Course, Level 1 & Level 2, 2012;

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

- Name: Bryan Zienta, P.E.
- Yrs. Inspection related experience: 26-years+
- 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: Bryan Zienta, P.E.
- Yrs. Inspection related experience: See Above
- List courses attended (& approx. dates): See Above
- Indicate the percentage of time spent on the listed duties in the previous year

%TIME

30%	Bridge/Culvert inspection	0%	Surveying
15%	Bridge Design/Plan prep	46%	Other -
2%	Bridge Construction	_____	100%
2%	Bridge Maintenance		
5%	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)**

a. List Ohio PE # 66130

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

- Name: Done By Contract – ODOT prequalified – SJCA Engineers & Surveyers
- Yrs. Inspection related experience: _____
- List courses attended (& approx dates) _____
_____
_____

C. INSPECTION EQUIPMENT

1. Type of vehicle used for inspections: Pick-up Truck (Chevy Colorado), SUV (Ford Escape, Bucket Truck (If Requested), Fire Department Ladder Truck (upon request)

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?	13'	Wire Brush	YES
6' Folding Rule	YES	Calipers	YES
100' Fiberglass Tape	YES	Shovel	YES
Geologist Hammer	YES	Screw Driver	___
Inspection Mirror	YES	Pliers	___
Flashlight	YES	Wrenches	___
Thermometer	___	Sounding Chains	YES
Plumb Bob	YES	Hip Boots and Waders	YES
Camera	YES	Paint Stick/Crayon	YES
2'-0" Level	___	Scraper	___
Brush Hook/Axe	YES	Probing Rod	YES
Boat	YES	Vertical Clearance Rod	___

3. List types of NDT methods used (IE. dye penetrant, magnetic particle, ultrasound)
   Chain
4. How is usage determined?
   Chaining is done on concrete decks, other methods would be contracted if needed.
5. List additional items

6. What equipment does your team have available for "hands on" access to FCM bridge members? **(Metric 16)**
   None Needed

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? Not used

D. INSPECTION PROCEDURES

1. Approximately how many inspections were made during last calendar year? **(Metric 6)**
   181+
2. Approximately how many inspections are scheduled for the current calendar year? **(Metric 6)**
   181+
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 (1-2 Hours)(SFN 4860101 may take 4-8 several hours)
   b. Slab (1 hour)
   c. Truss (pony/through/deck) (1 hour – through only)
   d. Culvert (15 Minutes + travel time)

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: In field on ODOT SMS System

   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? 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 X No ___) If Necessary

   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)** Bridge Engineer – examination of current/anticipated conditions

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)**

The bridge inspection course has been repeated multiple times; bridge inspection refresher courses have been taken and repeated; other coursework has been taken including bridge management, load rating, design etc.. and the CEAO has a Quality Assurance Review Program.

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)**

Not Applicable – There are none

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

Not Applicable – There are none

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 ___ No ___) Not Applicable – There are none

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

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

195

2. How many bridges are inspected by probing?

194

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)**

None

5. How many structures are coded 6 on item 113 Scour Critical? **(Metric 18)**
NONE
6. How are scour evaluations performed? **(Metric 18)**
In the field by the Bridge Engineer/Inspector
7. Who determines the need for diving inspections and by what criteria?
Bridge Engineer – If the bridge foundations can't be evaluated with enough certainty during low water conditions, an underwater inspection is warranted.

F. INVENTORY

1. What kinds of inventory quality assurance checks are performed? **(Metric 22)**
The entire inventory was updated 10-years ago (+/-) over a 2-year period and each bridge was load rated. As bridges are replaced or re-habilitated, the inventory is updated.
2. How often is the inventory checked for needed updates? **(Metric 22)**
When updated information is requested to be performed by ODOT or the CEAO, updated are completed.
3. How is the inventory data input into the system?
The data is updated in the ODOT SMS by the Bridge Engineer. The Bridge Engineer is the only person at the Lucas County Engineer's Office with access to the ODOT SMS.
4. When is the updated inventory data forwarded to ODOT? **(Metric 23)**
Instantly through updating in the ODOT SMS
Changes discovered during inspection?
Can be done instantly in the field through updating in the ODOT SMS
Changes from new construction or rehab?
Annually for rehab or within weeks of opening for new construction in the ODOT SMS

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)
Lucas County has no fracture critical bridges.
b. Bridges requiring underwater inspections
SFN 4860101 is the only Lucas County Bridge requiring Underwater Inspection.
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 X N___) 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, verbally and through a work order. If maintenance requiring immediate attention is identified, a call is made to County Maintenance personnel and followed up with a work order. If the problem doesn't require immediate attention, it is added to a list of maintenance items given to County Maintenance personnel annually.

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

If maintenance requiring immediate attention is identified, a call is made to County Maintenance personnel and followed up with a work order.

How is this emergency action documented?

All work orders are kept on file electronically and a hard copy of the work order may be kept on file for that particular bridge.

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

Separate work document. The emergency repair would begin and would be corrected before the inspection report was submitted.

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

The Bridge Engineer/Bridge Inspector, the Traffic Engineer and if a problem is identified by Maintenance Personnel in the field.

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)

75

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

195

4. By Whom **(Metric 13)**

Bryan Zienta, P.E. or a Consultant

5. When

10-years ago (+/-) the whole inventory of load ratings were updated. As conditions change, load ratings are updated. EV & SHV load ratings within 1 road mile of interchanges were updated in the past few years. Lucas County is beginning the process of updating load rating from BRASS/BARS to the new BrR Program.

6. Methods used **(Metric 13)**

10-years ago (2008 and 2009) the whole inventory of load ratings were updated using BARS and BRASS (LFD). Currently, the load rating inventory is being updated using BrR.

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

Bridges are re-rated if bridge conditions change as identified from bridge inspections, when bridges are replaced/rehabilitated or when requirements for load rating change (such as new EV or SHV requirements).

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

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

One – SFN 4830253

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

Analysis – Consultant performed Finite Element 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)**

None

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

None

1`6. Describe filing system (where files are kept): **(Metric 15)**

- Inspection reports, including old inspections

  Very old paper copies are in storage, past 20 years (+) are stored in computer files, backed up on a network server and on CDs.
- Design Calculations:

  Older files are in storage, some are stored in computer files, backed up on a network server
- Plans

  Hard copies of plans are hung and stored in the office, all current plans have been scanned and are accessible on the network computer. All obsolete plans are in storage.
- Load analysis calculations

  Old hand calculated bridge ratings are available in a 3 ring binder. All bridge have been load rated in-house using BARS or BRASS (Hand calculations for

BARS are contained in 3 ring binders). Bridge that couldn't be load rated by either method were load rated by a Consultant using Finite Element Analysis.

- Inventory forms
  There is an old obsolete card system in storage, there are old paper copies, information is available on the old CEAO Bridge BR86/BR87 program and all current inventory data is available on ODOT's SMS.
- Photos and sketches
  Photos are available for all bridges.
- Repairs and maintenance history
  Most repairs are done by contract with plans available including as built plans which are hung in the office, scanned and placed on the computer network. Maintenance that changes aspects of the bridge are kept in a file.
- Scour evaluation
  Scour has not historically been a concern in Lucas County. Due to the relatively flat terrain of Lucas County, sediment is more of a problem. Scour is monitored as part of the annual bridge inspection for each bridge.
- Scour POA
  If scour is identified during an annual bridge inspection or after a sever flooding event, corrective actions will be scheduled and any immediate danger would be immediately addressed.
- Fracture Critical File
  There are no Fracture Critical Bridges on the Lucas County inventory.
- Load Posting/Closing
  The only bridge posted for a reduced load limit is SFN 4830253. The load rating report from the consultant and the County Commissioners resolution is on file as hard copy and on the network in electronic format.
- Underwater inspections
  Only one bridge (SFN 4860101) requires an underwater inspection. The inspection performed by a consultant is kept in electronic format on the network computer, as a hard copy in the maintenance file for that bridge and as a hard copy in the Bridge Inspection Program file.
- Special inspection eqpt. or procedures
  There is a bridge on Centennial Road over Hanson's Quarry that is very high. To make a 'hands on' inspection of the weathering steel beams requires the use of the Sylvania Township Fire Department's ladder/bucket truck.
- Flood data, waterway adequacy, channel cross sections
  After major floods, high water data has been collected over the years with records kept by the survey department. Lucas County maintains FEMA data for the County. Channel cross sections have been collected and included in the replacement plans for bridges for over 20 years. Almost all of the named ditches and streams in Lucas County have channel profiles kept on file in the County Engineer's Office.

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)**
    There are no FC Bridge in Lucas County

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

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

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

Every 5-years or more frequent if necessary as determined by previous inspections.

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 NA 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.