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: **Highland County Engineer**

Checklist completed by: **Christian Dunlap** Date: **10/7/2019**

I. MAINTENANCE, REHABILITATION AND REPLACEMENT PROGRAM

A. NUMBER OF BRIDGES WITH MAINTENANCE RESPONSIBILITY

1. Greater than 20' long (NBIS length 23CFR 650c) **166**

2. Bridges >= 10' and <= 20' long **114**

B. PROCEDURES AND BUDGET

1. Contract repairs and replacement
   - List typical work items: **Federal Bridge Projects, 4-sides Box's, Guardrail projects, and Bridge Beam replacements.**
   - List approximate annual budget: **$0.00**
   - Are Fed Funds used? **Yes, Average 1 projects per five years.**
   - Are Credit Bridge funds used? **No**

2. In-house repairs and replacements
   - List typical work items: **Bridge projects less than $100,000, 4-sided box's, Small bridge projects, small span bridge beams replacement and concrete culvert installations.**
   - List approximate annual budget **$400,000.00**
   - List staffing availability: **2-3 Engineering & 6-8 Maintenance**

3. How are projects identified and selected? **Annual inspections, Accident Reports or Reports from General Public.**

4. How are plans developed for emergency repairs? **Once the emergency is identified, Engineering will perform an inspection. The inspection will determine if a repair is needed or if a road closure and a replacement is warranted. Either project is written up and reviewed by the County Engineer prior to work being developed by engineering or repair being done by a work crew.**

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

6. How is repair work documented? (i.e. work record, time card**) Work Record, Major Repairs are recorded in the SMS.**

7. Who is empowered to order emergency road closures and how is it done?
The County Engineer. Contact the Sheriff and emergency services, County crews then barricade and sign the closed structure.

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): **106**

2. Between 10' and 20' long (including 10' & 20') (ORC 5501.47, 5543.20): **166**

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: **Christian Dunlap**
- Yrs. Inspection related experience: **3 year**
- List courses attended (& approx dates): **E.I.T, ODOT Bridge Level 2 Inspection (2018),**
Bachelors Degree in Civil Engineering (2016), ODOT Bridge Inspection Refresher Course (2017).

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

- Name: **Christopher M. Fauber**
- Yrs. Inspection related experience: **12 years**
- List courses attended (& approx dates): **P.E. ODOT Bridge Level 2 Inspection, 2011.**

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

- Name: **Gary Martin**
- Yrs. Inspection related experience: **25 years**
- List courses attended (& approx. dates): **ODOT Bridge Inspection Level 2, 2011 and numerous other years).**

2017 Bridge Refresher

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

%TIME

___6__ Bridge/Culvert inspection
___2__ Bridge Design/Plan prep
__ 3__ Bridge Construction
__10__ Bridge Maintenance
___3__ Overload/Superload
___10__ Surveying
__ 66__ Other -
_____100%

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

- Name: **John Etienne**
- Yrs. Inspection related experience: **9 years**
- List courses attended (& approx dates): **ODOT Bridge Inspection Level 2, 2011 and numerous other years).**

2017 Bridge Refresher

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

%TIME

___6_ Bridge/Culvert inspection
___0_ Bridge Design/Plan prep
___3_ Bridge Construction
___10_ Bridge Maintenance
___ 0__ Overload/Superload
___10__ Surveying
___71__ Other -
_____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) : **Christopher M. Fauber**

a. List Ohio PE # **72239**

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: **2012 Ford Explorer**

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

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

4. How is usage determined? **Annual Inspection**

5. List additional items:

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

7. Use of equipment (Metric 16)
   a. How many bridges need a snooper? **30**
   b. How many bridges is it used on? **30**
   c. How often? **Every other year depending on condition.**

County has their own snooper

D. INSPECTION PROCEDURES

1. Approximately how many inspections were made during last calendar year? (Metric 6) : **282**

2. Approximately how many inspections are scheduled for the current calendar year? (Metric 6): **280**

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: **0.33**
   b. Slab: **0.25**
   c. Truss (pony/through/deck): **1.0**
   d. Culvert: **0.25**

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: **Bridges are recorded on Laptop with bridge software. Any changes or findings are recorded on paper also.**

   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?

   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): **Christopher M. Fauber – County Engineer in conjunction with Engineering, Site Evaluation determines the frequency.**

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)
A P.E. or E.I.T. is always present during inspections.

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)
No.

13. Do any bridges have fracture critical inspections done in less than 24 month intervals? (Metric 10)
All fracture critical inspections are done every 12 months.

14. Have all bridges requiring fracture critical inspections been inspected in 24 month intervals? (Metric 10)
Yes. All fracture critical inspections are done every 12 months.

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 ___)

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

1. How many bridges are considered scour susceptible? (Type of Service over Water) **277**
2. How many bridges are inspected by probing? **10-15**

3. How many structures are Scour Critical (item 113 - 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): **YES.**

5. How many structures are coded 6 on item 113 Scour Critical? (Metric 18): **0**

6. How are scour evaluations performed? (Metric 18): **Probing, measuring.**

7. Who determines the need for diving inspections and by what criteria? **Christopher M Fauber, depending on water depth and ability to probe.**

F. INVENTORY

1. What kinds of inventory quality assurance checks are performed? (Metric 22)
   Bridge inventory is constantly kept to date.
2. How often is the inventory checked for needed updates? (Metric 22)
   As soon as any change is made to a bridge.
3. How is the inventory data input into the system?
   With the inception of the SMS, data will now be directly uploaded.
4. When is the updated inventory data forwarded to ODOT? (Metric 23)
   Yearly, unless the bridge is retired or there is a change in loading or the bridge is improved.
   Changes discovered during inspection?
   Yearly
   Changes from new construction or rehab?
   As they are performed.

180 days maximum

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

   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 __X_ No ___) (Metric 15)

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

Written Project Request Forms

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

The County Engineer, Deputy Engineer, and Highway Superintendent.

How is this emergency action documented? — Use SMS critical Findings Report

Project request form for repairs.

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)

Inspection Team

H. LOAD ANALYSIS AND POSTING

1. Number of plans for existing bridges available for NBIS length bridges: **166**

2. Number of plans for non-NBIS bridges (>= 10' and <= 20' long): **114**

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

280

4. By Whom (Metric 13)

Varies

5. When

2010-2019

6. Methods used (Metric 13)

Varies by structure

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

Any bridge on a paving project has the loading updated immediately. As a practice we do not overlay bridges.

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): **Mix**

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): **3**

15. Number of NBIS bridges with Gusset Plates analyzed. (Metric 13): **3**

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

- Inspection reports, including old inspections = **folders, after 2007 digital on sever**
- Design Calculations = **Cadd files and bridge folder**
- Plans = **Plan drawer and folder**
- Load analysis calculations = **Folders and digital copies on sever**
- Inventory forms = **sever**
- Photos and sketches = **folders**
- Repairs and maintenance history = **folders and SMS**
- Scour evaluation = **Folders**
- Scour POA = **Folders**
- Fracture Critical File = **folders**
- Load Posting/Closing = **Folders**
- Underwater inspections = **n/a**
- Special inspection eqpt. or procedures = **n/a**
- Flood data, waterway adequacy, channel cross sections = **folders**

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)

Yearly, unless severity dictates, then 6 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) : **N/A**

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

22. List any complex bridges: (Metric 19) : **0**

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.