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: Cuyahoga County Department of Public Works

Checklist completed by: Demetrios J. Hazimihalis, P.E. Date: 09/09/2020

I. MAINTENANCE, REHABILITATION AND REPLACEMENT PROGRAM

A. NUMBER OF BRIDGES WITH MAINTENANCE RESPONSIBILITY

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

209

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

143

B. PROCEDURES AND BUDGET

1. Contract repairs and replacement
   - List typical work items Total Replacement, Rehabs, Deck Replacements
   - List approximate annual budget ~ $8,000,000
   - Are Fed Funds used? Yes
   - Are Credit Bridge funds used? No

2. In-house repairs and replacements
   - List typical work items Concrete, asphalt, steel, coatings, guardrail, stream work
   - List approximate annual budget ~ $2,500,000
   - List staffing availability 35

3. How are projects identified and selected?

Maintenance Projects are identified after the Annual Bridge Inspection. The Maintenance recommendations are identified for a structure and entered into the County ERP system. These recommendations are reviewed by management. Depending upon the level given to a maintenance recommendation, a plan will be developed by material type to determine, labor, material and equipment for each structure. Then the projects will be assigned to the supervisors via the ERP system. The supervisors will then develop a scope and estimate each project. Then they will be assigned to the work crews. The supervisor will oversee ordering material and quality assurance on the job. Technical questions shall be discussed with Chief Section Engineer or Engineer IV. Project will be closed out after review by either Chief Section Engineer, Engineer IV or Senior Project Manager on staff.

Bridge Replacements and Rehab Projects are discussed annually. The Bridge Design Team and Bridge Inspection Teams meet and discuss structures that need to be replaced, structures that will need to be sent out for construction and structures that can be handled in house. The Planning Department then handles securing funding for those projects that cannot be handled in house.

4. How are plans developed for emergency repairs?

Same as described for #3 for Maintenance Projects. If a structure needs to be closed, the County has the necessary means to do so via the County's Sign Shop.

5. Who does the work of emergency repairs? Depending upon the size, cost and complexity, County Bridge Maintenance Forces or through an On-Call Contractor Program developed at the County.

6. How is repair work documented? (i.e. work record, time card). Repair Work Is documented through the County's ERP (Enterprise Resource Planning Program). This program documents an estimate and actual expenditures for the repair work to be performed then tracks Labor, Material and Equipment used to complete the repair.

7. Who is empowered to order emergency road closures and how is it done? Emergency Road Closures are made by the Chief Section Engineer. An Emergency Road Closure is first identified by the Bridge Inspection Team. Once the Team has identified an item that could affect the travelling public, the Inspection Team Leader contacts the Chief Section Engineer to communicate their findings. The Inspection Team then will attempt to close the road and detour traffic. The Chief Section Engineer then contacts the local municipality that the structure needs to be closed due to a safety issue and requests assistance from local law enforcement until the County Sign Shop can arrive to set up barricades and a detour. At the same time, the Chief Section Engineer notifies the County Administration that a closure has been put into place so that a press release can be sent out to the travelling public.

II. INSPECTION PROGRAM (ASSET WISE 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)**

209

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

143

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: Demetrios J. Hazimihalis, P.E., MSCE
- Yrs. Inspection related experience: 20 Years, 2 months
- List courses attended (& approx dates) ODOT Level 1 Bridge Inspection Course- May 2003, ODOT Level 2 Bridge Inspection Course – May 2004, US-Army Corp of Engineers - Stream Stabilization Workshop – August 2006, Bridge & Pavement Safety Applications – September 2006, ODOT LRFD Steel Design – February 2007, Movable Bridges Training – February 2007, ODOT LRFD Prestressed Concrete Design – April 2007, ODOT LRFD Loads & General Overview -November 2006, ODOT Load Rating Bridges & Culverts – January 2008, PennDOT Fracture Critical Bridge Inspection Techniques – February 2010,Confiend Space Entry Program – September 2010, ODOT MBI Manual Update -March 2011, ODOT Load Rating of Masonry Arches – July 2011, ODOT LRFR Training – July 2011, Guardrail Installation Training – April 2013, Virtis Training – April 2011, Structure Management System Training – February 2013Vehicular Truss Bridge Solutions – December 2014, NHI Bridge Maintenance Training – June 2015, Work Type 26 – Structural Steel Painting Course – March 2106, Work Type 57 Concrete Sealer Training – May 2016, Element Level Bridge Inspection – April 2016, ODOT Culvert Inventory & Inspection Course – December 2017

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

- Name: Jon Osterstock
- Yrs. Inspection related experience: 17 Years
- List courses attended (& approx dates) ODOT Level 1 Bridge Inspection Course – Sept 2017, ODOT Level 2 Bridge Inspection Course – Oct 2017, Fracture Critical

Inspection Course – Nov 2018, ODOT Culvert Inventory & Inspection Course – Dec 2017

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

- Name: Jeffrey M. Dobransky
- Yrs. Inspection related experience: 35 Years
- List courses attended (& approx dates) ODOT Bridge Inspection Training – April 1987, April 1989, April 1991, May 1993, NICET Bridge Inspection Level 3 Training – April 1994, May 1995, March 1997, February 1999, Advanced Inspection Training – April 1999, ODOT Culvert Inventory & Inspection – November 2004, December 2017, ODOT Storm Water Management - September 2006, Movable Bridges Training – February 2007, ODOT Manual of Bridge Inspection Update – March 2011, Structure Management System Training – February 2013, ODOT Traffic Signs & Pavement Marking – March 2013, Construction Inspection Overview – June 2013, Introduction to Element Level Bridge Inspection – April 2014, Element Level Bridge Inspection Training – April 2015

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

%TIME

75% Bridge/Culvert inspection	_____ Surveying
_____ Bridge Design/Plan prep	10% Other -
_____ Bridge Construction	_____100%
15% 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: Matthew A. Pastorelle
- Yrs. Inspection related experience: 10 Years, 11 Months
- List courses attended (& approx dates) ODOT Bridge Inspection Level 1 – March 2010, Bridge Inspection Level 2 – April 2010, ODOT Element Level Bridge Inspection Training – April 2016, Structure Management System Training - February 2013, Fracture Critical Inspection Techniques for Steel Bridges- January 2012, ODOT Manual of Bridge Inspection Update – March 2011, Culvert Inventory & Inspection - December 2017

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

%TIME

75% Bridge/Culvert inspection
_____ Bridge Design/Plan prep
_____ Bridge Construction
15% Bridge Maintenance
5% Overload/Superload
_____ Surveying
5% Other – Load Ratings
_____100%

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

- Name: David A. Griesmer
- Yrs. Inspection related experience:9 Years, 5 Months
- List courses attended (& approx dates) ODOT Bridge Inspector Level 1 – July 2009, ODOT Bridge Inspector Level 2 – April 2010, Element Level Bridge Inspection Training – April 2015, ODOT Manual of Bridge Inspection Update – March 2011, Structure Management System Training – February 2013Construction Plan Reading – March 2002, R/W Plan Reading – April 2002, ODOT Culvert Inventory & Inspection – December 2017

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

%TIME

75% Bridge/Culvert inspection
_____ Bridge Design/Plan prep
_____ Bridge Construction
15% Bridge Maintenance
_____ Overload/Superload
_____ Surveying
10% 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: Ryan Baker
- Yrs. Inspection related experience: 3 Months
- List courses attended (& approx dates) _____
_____
_____

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

%TIME
85% Bridge/Culvert inspection
_____ Bridge Design/Plan prep

_____ Bridge Construction	_____ Surveying
10% Bridge Maintenance	5% Other – Load Rating
_____ Overload/Superload	_____100%

10. **Load Rating Engineer** – Name of individual responsible for load ratings (must be PE) **(Metric 4)**

a. List Ohio PE # Demetrios J. Hazimihalis – Ohio PE# 70890

b. List Ohio PE# Jon Osterstock – Ohio PE# 82062

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

- Name: Bradley Walden & Zach Harrison
- Yrs. Inspection related experience: 12 Years & 4 Years
- List courses attended (& approx dates) NHI – Bridge Inspection Refresher Training, NHI- Underwater Inspection Training

C. INSPECTION EQUIPMENT

1. Type of vehicle used for inspections

Two (2) - Ford Transit 350 Vans; One (1) Ford Taurus; One (1) Ford Explorer

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

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

NDT Methods - Dye Penetrant Kit, Positector DFT Thickness Gage

4. How is usage determined?

Usage is determined upon findings in the field during bridge inspections.

5. List additional items

N/A

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

Cuyahoga County has access to a Snooper Platform Truck and a Bucket Truck.

7. Use of equipment **(Metric 16)**
   a. How many bridges need a snooper? Fifteen (15)
   b. How many bridges is it used on? Ten (10)
   c. How often? Annually

D. INSPECTION PROCEDURES

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

504

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

499

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

3

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

   a. Beam/Girder – 2.5 Hours
   b. Slab – 1.5 Hours
   c. Truss (pony/through/deck) – 4.0 Hours
   d. Culvert – 1 Hour

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: Both. A paper copy of the previous years inspection is printed and taken out into the field and marked up with current data. The inspector then will enter the report while in the field using a laptop along with labeling photos and entering any maintenance recommendations into the County's ERP system.

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

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

Are Bridge comments recorded? (Yes √ No ___) Where? The comments are recorded and documented on the paper copy then transferred to the Assetwise report.

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)**

The Chief Section Engineer (Demetrios J. Hazimihalis) determines the need for a routine inspection frequency greater than once a year. The criteria used is dependent on the General Appraisal, structure type and amount of daily traffic.

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

Jefferson Avenue Bridge 0057 – SFN – 1831402. Frequency – Every 6 months due to condition of the structure. Fracture Critical every 24 months.

9. Does the inspection team believe it has enough time to do the job? (Yes √ No ___)

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

Cuyahoga County Performs at least three (3) QA/QC Reviews per year per team.

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 √ No ___)

Routine Annual Inspections? (Yes √ No ___)

Special Inspections? (Yes √ No ___)

Underwater Inspections? (Yes √ No ___)

Fracture Critical Inspections? (Yes √ 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)

274

2. How many bridges are inspected by probing?

272

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)**

N/A

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

N/A

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

During Annual Bridge Inspection Process, if a structure has a scour rating of a "3" or less, a Scour Critical Susceptibility Assessment Form is utilized by the Bridge Inspection teams.

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

Demetrios J. Hazimihalis – Program Manager. The criteria is typically determined by the findings on the BR-86, structures with substructure elements in the Cuyahoga River that cannot be found using conventional means (probing, etc) and through the County Scopur POA.

F. INVENTORY

1. What kinds of inventory quality assurance checks are performed? **(Metric 22)**

Typically, Inventory Quality Assurance checks are made when a new structure is put into place, rehabilitated or Load Rated as a rule.

2. How often is the inventory checked for needed updates? **(Metric 22)**

Annually – Typically in the dead period after mid-February.

3. How is the inventory data input into the system?

Bridge Inspection/Maintenance Staff typically will update the inventory on the AssetWise System.

4. When is the updated inventory data forwarded to ODOT? **(Metric 23)**

Changes discovered during inspection? Yes. However, this is a rare occasion as the Inventory Data rarely changes other than Load Rating, ADT, etc.
Changes from new construction or rehab? Yes. Whenever changes are made during new construction or rehab, ODOT and others will be notified.

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)

Columbus Road Lift Bridge 0056– SFN: 1833758
Denison-Harvard Road Bridge 0409– SFN: 1832344
Eastland Road Bridge R0196– SFN: 1840754
Fairmount BLB Bridge 1080 - SFN: 1831038
Hillside Road Bridge 0381 – SFN: 1832107
Jefferson Avenue Bridge 0057 – SFN: 1831402
Jennings Road Bridge 0097 – SFN: 1833766
Lewis Road Bridge 0291 – SFN: 1834231
Old Mill Road 0112 – SFN: 1832271
Pleasant Valley Road Bridge 0968 – SFN: 1830465
Track Avenue Bridge 0057 – SFN: 1832433

b. Bridges requiring underwater inspections

Columbus Road Lift Bridge 0056– SFN: 1833758
Denison-Harvard Road Bridge 0409 – SFN: 1832344
Harvard Avenue Bridge 0016- SFN: 1830651
Old Rockside Road Bridge 0042– SFN: 1876082
Rockside Road Bridge 0332 – SFN: 1830279

c. Bridges with unique or special features (i.e., pin & hanger, draw, suspension)

Columbus Road Lift Bridge – SFN: 1833758

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 during bridge inspection?
(Y √ N___) **(Metric 15)**

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

Routine Bridge Maintenance problems are documented into the County's ERP system. Once entered into the system, the inspector will assign the work project/assignment to a

Maintenance Supervisor who then will schedule the work to be performed. All labor, material and equipment is logged into the Force Account format for auditing purposes.

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

Bridge Inspectors immediately notify Demetrios J. Hazimihalis or Jon Osterstock when Emergency Repairs or Critical Findings are necessary.

How is this emergency action documented?

The Emergency action is documented into the County ERP system. All the details associated with the Emergency Action along with photos are download into the system. The Work Order is then reviewed by the Program Manager or Engineer IV. Once reviewed and a plan of action or repair method is developed, the Work Order is assigned to a Maintenance Supervisor. The Maintenance Supervisor will then develop an estimate for the work to be performed and track labor, material and equipment costs associated with the project.

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

Emergency repairs are noted as part of the inspection report and detailed into the County's ERP system.

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

The Bridge Inspection Teams will inspect and check the proper placement of signs. Also, the County Sign Shop will also perform QA/QC checks on County Roads to ensure that the Signs are placed properly and that the Signs are in working order.

H. LOAD ANALYSIS AND POSTING

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

209

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

131

3. Number of bridges analyzed in accordance with the *AASHTO Manual for Bridge Evaluation* **(Metric 13)** - 209

4. By Whom **(Metric 13)** - Demetrios J. Hazimihalis, Jon Osterstock, Jeffrey D. Horvath, James Kushner & Various Consultants

5. When – Initial Load Ratings, Structural Damage, Changes to Superstructure during repairs, Update Load Ratings for SHV's & EV's.

6. Methods used **(Metric 13)** – LFD, LRFR, Computer Programs – BrR, Brass, Excel Spreadsheets, Hand Calcs, etc

7. When are bridges rerated and how do load raters keep up with overlays and other changes? **(Metric 13)** – Typically, this information is shared with the Load Raters and placed into the files if an overlay or other changes are made. Since our department is the ones that are usually making the changes, we will know firsthand.

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)** - 15

11. How determined (engineering judgment, analysis, mix) – Structural Analysis utilizing Load Rating Software Programs

12. List bridges closed due to condition rating (rough check) - 2

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 - Hard Copy in Filing Cabinet, Digital Copy on Server
- Design Calculations – Bridge Design Office, Hard Copy in Files
- Plans- Hard Copy in Storage, PDF Copy on Server
- Load analysis calculations – Hard Copy in File, PDF Copy on Server
- Inventory forms – Hard Copy in File
- Photos and sketches – PDF Copy On Server
- Repairs and maintenance history – PDF Copy On Server, Hard Copy in File
- Scour evaluation – Hard Copy in File, PDF Copy On Server
- Scour POA – Hard Copy in File, PDF Copy on Server
- Fracture Critical File – Hard Copy in File, PDF Copy On Server
- Load Posting/Closing – Hard Copy on File, PDF Copy On Server

- Underwater inspections – Hard Copy on File, PDF Copy on Server
- Special inspection eqpt. or procedures – PDF Copy on Server
- Flood data, waterway adequacy, channel cross sections – PDF Copy on Server

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 _√_ No ___)

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

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

60 months

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

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

Columbus Road Lift Bridge 0056 – SFN: 1833758

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

Describe:

Fracture Critical Inspection Training, Movable Bridge Inspection/Maintenance Training, Climbing Techniques Training, NDT Equipment Training -In House

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.