PUBLIC NOTICE

PUBLIC SERVICES COMMITTEE MEETING
Chair: Amy Brewer
Committee Members: Fred Albrecht and Kim Chamberland

Thursday, August 1, 2019 at 4:30 P.M.
City Council Chambers
745 Center Street, Milford, Ohio 45150

AGENDA

Call to Order

Proceedings: Approval of the July 10, 2019 Public Services Committee Minutes

Agenda Items:

- Discussion: 5 Ton Vehicle Limits within the City
- Municipal Bridge Inspection Program Renewal
- And all additional matters that may properly come before the committee

Adjourn

Public Services Committee Meeting Minutes

July 10, 2019

Called to Order: 8:00am by Amy Brewer

Present: Ms. Brewer, Ms. Chamberland, Mr. Albrecht

Staff: City Manager, Michael Doss, Finance Director, Pat Wirthlin, Public Works Director, Nate Clayton, Community & Information Services Manager, Lori Pegg, Administrative Assistant, Jackie Bain

Visitors: none

- *Approval of Proceedings: The committee unanimously approved the proceedings from the May 15, 2019 Public Services Committee meeting.*

Change Order - Trailhead Retaining Wall

Mr. Doss explained that SP Contracting LLC submitted information for additional work that was needed to be done at the Trailhead. Mr. Clayton discussed that the top of the existing foundation wall was in worse condition that originally thought. When demoing off the failing cap over the existing foundation wall, the top foot of stones that were to be tuckpointed needed to be reset. This required additional concrete and week of labor. In addition, the cap needed to be extended to tie into the new foundation wall on the Clark/North side. The original contract was $27,100 with a $20,000 Clermont county grant to subsidize. This Change order is for the final quantities required to complete the project, totaling $3,704.05.

The Committee Agreed to Make A Motion Authorizing the Law Director to Prepare an Ordinance Authorizing A Change Order to The Contract with SP Contracting LLP For the Trailhead Retaining Wall in The Amount Of $3,704.05

Amending Appropriation Ordinances 18-1413, 19-1422, 19-1434 and 19-1439

Ms. Wirthlin discussed the change order information and the appropriation changes thru the Parks and Recreation Fund.

The Committee Agreed to Make A Motion Authorizing the Law Director to Prepare an Ordinance Amending Appropriation Ordinances 18-1413, 19-1422, 19-1434, And 19-1439 In the Total Amount Of $7,410 As Follows
Appropriation Increase for Trail Head Foundation Wall in Parks and Recreation Fund 204- $3,705 / Transfer from General Fund 101 To Parks Fund 2014 For Trailhead Foundation Wall-$3,705

Designated Outdoor Refreshment Area

Ms. Pegg had Legislation to present to the committee to bring before council regarding the Designated Outdoor Refreshment area. The information has been well received. This will be the final step for the city in the process.

The Committee Agreed to Make A Motion Authorizing the Law Director to Draft an Ordinance Creating A Designated Outdoor Refreshment Area for The City of Milford And Enacting Regulations

Castleberry Lift Station Upgrade Contract No. S-2019-01

Mr. Clayton informed the committee that we are upgrading the lift station pumps at the lift station. The pumps are continually failing requiring our crews to pump the lift station down, sometimes multiple times in a week. Our budget was $300,000 to replace the force main and upgrade the lift station. Upon further investigation and testing, the force main did not need to be replaced. The engineers estimate based just the lift station upgrade was $214,000. We had 4 contractors pick up plans, we received 2 bids. The bids were opened July 3rd at 2pm. The low bid was Buckeye Pumps, Inc at $193,974. Environmental Engineering Services also verified the bids and recommend Buckeye Pumps, Inc. Mr. Clayton also explained that they are upgrading the pumps that are currently at the lift station due to wear and tear. Some of which are not working, one that is not working and one working sometimes. They are going to be replaced and tied into the SCADA system and waterproofing the inside of the lift station. The pumps would be able to handle expansions of the buildings at Castleberry. We are going from a 5 HP to 7 ½ HP on the pumps. It will be an upgrade/replacement.

The Committee Agreed to Make A Motion Authorizing the Law Director to Draft an Ordinance Authorizing the City Manager to Enter into A Contract with Buckeye Pumps Inc In the Amount Of $193,974

2019 Mill Street Storm Outfall Replacement Contract STM-2019-2

Mr. Clayton brought to the committee's attention that earlier this year, we had bids to line the last section failing storm sewer to the river located behind the 208 Mill Street in our easement on property owned by TerraFirm. It is restricting some flow and potentially going to fail. We originally put the bid out to line it but found that the bids came in at over 10% of the estimate. As it turns out, we put the bid back out as a replacement project with a budget of $65,000 estimate to replace the line, so the Lining bids were thrown out. within the easement we have for the storm line. We received 6 bids. Bids to replace our failing main storm sewer line behind the 208 Mill Street were opened July 3, 2019 at 2pm. The 2 low bidders were DER at $59,580 and Stauffer Site Services at $57,340. Both Contractors have done work for us in the past and have done a good job. DER would require less site

management as the owner is the same as the owner of the property on which we have an easement.

The Committee Agreed to Make A Motion Authorizing the Law Director to Draft an Ordinance Authorizing the City Manager to Enter into A Contract With DER *In the Amount Of* $59,580

OPWC Grant Application

Mr. Clayton presented information that the lift station pumps are continually getting plugged with rags, feminine hygiene products and flushable wipes, through our sewer system causing the pumps to fail. This station receives the flow for the entire wastewater system and pumps it up to the treatment plant. We need to replace the screen system at the plant lift station with an inline grinder. We currently do not have a grinder in this system. Attached in the packet was information on the type of grinder called the "Muffin Monster". Since this is an upgrade it qualifies for OPWC funds. The preliminary budget is $150,000 of which we will ask OPWC for 49% to get more points for the grant application. This will be in for the 2020 budget.

The Committee Agreed to Make A Motion Authorizing the Law Director to Draft an Ordinance Authorizing the City Manager to Apply for Funding from The Ohio Public Works Commission for WWTP Plant Lift Station Screen Upgrade

Mr. Clayton also discussed SR 126 Urban Paving project – it is almost complete. The thermo application is still to be done.

The Milford South School property landscape is being maintained.

There being no additional business, Ms. Brewer adjourned the meeting at 8:47am

Respectfully Submitted,
Jackie Bain

"These minutes have been approved and adopted by Ms. Brewer July 12, 2019, Ms. Chamberland July 13, 2019 and Mr. Albrecht July 14, 2019 via email."

PRELIMINARY LEGISLATION

Consent

Rev. 6/26/00

Ordinance/Resolution # : _____

PID No. : 109334

County/Route/Section : _____

The following is a/an _____ enacted by the _____ of _____
(Ordinance/Resolution) (Local Public Agency)
County, Ohio, hereinafter referred to as the Local Public Agency (LPA).

SECTION I – Project Description

WHEREAS, the (LPA) has determined the need for the described project:

Bridge Inspection Program Services, including, but not limited to routine inspections, element level inspections, critical-findings reports, fracture critical member inspections, load rating calculations and reports, weight limits posting sign recommendations, scour assessments, scour plan of actions, development of fracture critical plans, and underwater dive inspection reports if needed.

NOW THEREFORE, be it ordained by the _____ of _____ County, Ohio.
(LPA)

SECTION II – Consent Statement

Being in the public interest, the LPA gives consent to the Director of Transportation to complete the above described project.

SECTION III – Cooperation Statement

The LPA shall cooperate with the Director of Transportation in the above described project as follows:

The State shall assume and bear 100% of all of the cost for Bridge Inspection Program Services requested by the City and agreed to by the State. Eligible Bridge Inspection Services are described in the Consultant's Scope of Services Task Order Contract (Exhibit A).

The LPA agrees to pay 100% of the cost of those features which are not included in Exhibit A. Those features may include but not limited to the purchasing and erecting the recommended weight limits postings signs, the implementation of critical findings reports such as partial or total bridge closures, the implementation of the scour plan of actions. When recommendations affect public safety, ODOT expects full implementation by the LPA. Starting in October 2019, FHWA requires installing weight limits posting signs within 30 days from the official date of the approved recommendations. Timely implementation is essential to the success of this program.

PID No.: **109334**

SECTION IV – Utilities and Right-of-Way Statement

The LPA agrees that all right-of-way required for the described project will be made available in accordance with current State and Federal regulations.

SECTION V Authority to Sign

I, _____ of said _____ is hereby empowered on behalf of the
(Contractual Agent) (LPA)
_____ to enter into contracts with the Director of Transportation which is necessary to
(LPA)
complete the above described project.

Passed: _____, 2_____.
(Date)

Attested: _____ _____
(Clerk) (Contractual Agent of LPA – title)

Attested: _____ _____
(Title) (President of Council)

The _____ is hereby declared to be an emergency measure to expedite the highway project and
(Ordinance/Resolution)
to promote highway safety. Following appropriate legislative action, it shall take effect and be in force immediately upon its passage and approval, otherwise it shall take effect and be in force from and after the earliest period allowed by law.

PID No.: 109334

CERTIFICATE OF COPY
STATE OF OHIO

_____ of _____ County, Ohio
(LPA)

I, _____, as Clerk of the _____
(LPA)
of _____ County, Ohio, do hereby certify that the foregoing is a true and correct copy of
_____ adopted by the legislative Authority of the said
(Ordinance/Resolution)
_____ on the _____ day of _____, 2_____.
(LPA)
That the publication of such _____ has been made and certified of record according to
(Ordinance/Resolution)
Law; that no proceedings looking to a referendum upon such _____ have been taken;
(Ordinance/Resolution)
and that such _____ and certificate of publication thereof are of record in _____,
Page _____. (Ordinance/Resolution)
(Record No.)

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my official seal, if applicable, this _____ day of _____ 2_____.

_____
(Clerk)

(CITY SEAL)

_____ of _____ County, Ohio
(LPA)

(If the LPA is designated as a City then the "City Seal" is required. If no Seal, then a letter stating "No Seal is required to accompany the executed legislation.)

The aforegoing is accepted as a basis for proceeding with the project herein described.
For the _____ of _____ County, Ohio.
(LPA)

Attested: _____ _____ Date _____
(Contractual Agent)

For the State of Ohio

Attested: _____ _____ Date _____
(Director, Ohio Department of Transportation)

Approved Final Scope of Services Minutes Date: _____

GENERAL ENGINEERING SERVICES
Central Office, Office of Structural Engineering
Scope of Services

The CONSULTANT may be required to perform the following services on a task order type basis for bridges designated by regulation or by agreement as City or Village inspection responsibility. Tasks which may include but are not limited to the following:

Task 1 - Scour Tasks
- Task 1A - Scour Critical Assessment
- Task 1B - Scour Plan-of-Action
- Task 1C – Scour Analysis

Task 2 - Load Rating Tasks
- Task 2A - Field Measurements for Load Rating
- Task 2B - Load Rating Calculations

Task 3 – SMS Structure Inventory and Review

Task 4 – Inspection Procedures
- Task 4A - Fracture Critical Plan
- Task 4B – Underwater Inspection Procedures

Task 5 - Bridge Inspection
- Task 5A – Routine Bridge Inspection
- Task 5B – Fracture Critical Inspection
- Task 5C – Underwater Dive Inspection

Services shall be conducted in accordance with the following:

- ODOT Manual of Bridge Inspection, Latest Version
- ODOT SMS Bridge and Inventory Coding Guide, Latest Version
- ODOT Bridge Design Manual, Section 900), Latest Version
- Hydraulic Engineering Circulars 18, 20 and 23
- The Manual for Bridge Evaluation, Second Edition 2013 interim with revisions, AASHTO

Publication

- Bridge Inspector's Reference Manual, FHWA NHI Publication Number: 12-049, Publication Year: 2012
- Underwater Bridge Inspection, FHWA Publication Number: FHWA NHI-10-027, Publication Year: 2010

The CONSULTANT shall maintain a project cost accounting system that will segregate costs for individual task orders. The invoicing progress reports shall be detailed enough to show the breakdown of each assigned structure indicating the status of all subtasks. Completion of the individual subtasks in necessary for reimbursement credits.

The Department will be performing an annual Quality Assurance Review (QAR) for each selected consultant in accordance with Manual of Bridge Inspection to ensure accuracy and consistency of the inspection and documentation in SMS. This typically includes an office and field review.

The project will be divided into four (4) sub-projects (SP). A CONSULTANT will be selected for each sub-project. Municipalities opted into the previous inspection program will have the option to renew their legislation. Municipalities with population greater than 50,000 people are excluded from the program. The sub-projects have the following general geographic areas, category characteristics, and maximum contract values for the municipalities with municipal inspection responsibility obtained from SMS data as of March 2019.

Project: SP01 - District (1, 2, &3), Total Structures = 435*

Type	L =< 20'	20' < L =< 60'	60' < L =< 200'	L > 200'	Total
Single Span	170	158	24	0	**352**
Multi-Span	21	18	29	15	**83**
Culvert	156	45	0	0	**201**
Truss	0	0	2	0	**2**
Underwater Inspection	0	0	0	0	**0**
Fracture Critical Inspection	0	4	0	0	**4**
Load Rating**	149	75	16	10	**250**

* Level 1 bridge inspection structures
** Tasked as budget allows w/priority for NBI bridges

Project: SP02 - District (4, 11, &12), Total Structures = 270*

Type	L =< 20'	20' < L =< 60'	60' < L =< 200'	L > 200'	Total
Single Span	86	86	25	0	**197**
Multi-Span	16	14	27	16	**73**
Culvert	82	36	0	0	**118**
Truss	1	1	5	0	**7**
Underwater Inspection	**0**	**0**	**0**	**1**	**1**
Fracture Critical Inspection	**0**	**1**	**5**	**0**	**6**
Load Rating**	67	35	16	5	**123**

* Level 1 Bridge Inspection structures
** Tasked as budget allows w/priority for NBI bridges

Project: SP03 - District (5, 6, &10), Total Structures = 355*

Type	L =< 20'	20' < L =< 60'	60' < L =< 200'	L > 200'	Total
Single Span	132	126	29	0	**287**
Multi-Span	7	8	35	18	**68**
Culvert	108	62	4	0	**174**
Truss	0	0	8	0	**8**
Underwater Inspection	0	0	1	1	**2**
Fracture Critical Inspection	0	0	8	1	**9**
Load Rating**	141	73	20	8	**242**

* Level 1 bridge inspection structures
** Tasked as budget allows w/priority for NBI bridges

Project: SP04 - District (7, 8 &9), Total Structures = 426*

Type	L =< 20'	20' < L =< 60'	60' < L =< 200'	L > 200'	Total
Single Span	150	125	29	0	**304**
Multi-Span	27	42	41	12	**122**
Culvert	135	93	30		**231**
Truss	0	1	5	1	**7**
Underwater Inspection	0	0	1	1	**2**
Fracture Critical Inspection	0	2	4	1	**7**
Load Rating	180	81	27	2	**290**

* Level 1 bridge inspection structures
** Tasked as budget allows w/priority for NBI bridges

Please note that the total number of structure types is estimated based on current SMS data query, and it may be adjusted when tasks are assigned in the future.

UNDERSTANDING

1. Inspections shall be completed by firm's full-time staff prequalified with ODOT for Level 1 bridge inspection according to the Manual of Bridge Inspection.

2. Task order are intended for maintaining compliance with the FHWA 23-Mertics, Ohio Revised Code, and ODOT policy manuals. Deadlines set by the task orders shall be respected.

3. All reports and records compiled under this agreement shall become the property of the City or Village and shall be housed in the City or Village. ODOT shall receive an electronic copy of plans, analysis files, reports and other items mentioned below.

a) CONSULTANT shall perform all applicable updates to SMS with new or revised information for structure inventory and appraisal data, inspections, scour, fracture critical members, and load ratings.

b) CONSULTANT shall submit copies of all reports and calculations electronically, or in hard copies when requested, to the City or Village for inclusion in their bridge records.

c) This includes, as applicable, a printed copy of the inspection report, Scour Plan-of-Action, Fracture Critical Plan, load rating report, gusset plate analysis, inspection procedures, and field measurement notes, digital pictures as well as a reproducible digital data file (.pdf, .doc, .xml, and .xls formats).

4. Copies of all transmittal letters related to this Task Order shall be submitted to Central Office, Office of Structural Engineering.

a) When required, CONSULTANTS shall locate the original construction plans, as-built, and shop drawings from archive locations specified by the municipality and upload them onto SMS.

Services to be furnished by CONSULTANT may include:

TASK 1 - SCOUR TASKS

Task 1A – Scour Critical Susceptibility NBIS Item 113) - The CONSULTANT shall refer to the most recent ODOT Manual of Bridge Inspection. Deliverables include field notes, a completed Scour Critical Assessment Checklist as per Appendix I of the 2014 Manual of Bridge Inspection, and any other reference material needed for the bridge

owner to properly maintain their bridge files. Channel photos or cross sections maybe tasked under this item if assigned.

Task 1B - Scour Plan-of-Action - The CONSULTANT shall refer to the most recent ODOT Manual of Bridge Inspection Appendix H for the scope of this task. Deliverables include a completed Scour Plan-of-Action, field notes, calculations, and any other reference material needed by bridge owner to maintain bridge files.

TASK 2 – LOAD RATING TASKS

Task 2A - Field Measurements for Load Rating - Should no plans exist or if additional information is required, each main member shall be field measured for load rating. The condition of the member should be noted on the field documentation. All measurements shall be included in the load rating report.

Task 2B - Load Rating Calculations – A bridge carrying vehicular traffic shall be rated to determine the safe load carrying capacity. The CONSULTANT shall review existing bridge plans and inspection reports and other inspection information such as photographs and estimates of section loss for bridge members and connections. The analysis for existing structures shall be performed for AASHTO HS20-44 [MS 18] (truck, lane, & military) loading for both inventory and operating levels, and for the four Ohio Legal Loads including the special hauling vehicles (2F1, 3F1, 4F1, and 5C1, SU4, SU5, SU6, SU7, EV2, and EV3) at operating level. The CONSULTANT shall try to complete the load rating analysis utilizing BrR (Virtis) at first. Hand-calculations or Spreadsheets if BrR is not applicable. The BrR analysis file, other load rating files, and BR100 shall be included with the submittal to OSE.

The inventory and operating ratings shall be coded as per the most recent version of the ODOT Bridge Inventory Coding Guide. Update SMS Inventory with the load rating results and upload BR100 pdf file.

The electronic deliverable shall include if applicable an Excel spreadsheet or other files used for analysis for each bridge which shall include the member areas, member capacities both with and without section loss, influence lines (can be the ordinates or graph of the lines), dead loads and dead load stresses in members, live loads and live load stresses in members for all truck loadings and the load ratings of the members. Truck loadings to be used for the ratings are specified in BDM Section 900.

The Load Rating Report shall be prepared by a registered or non-registered engineer and it shall be checked, signed, sealed and dated by an Ohio Registered Professional Engineer.

The Load Rating Report shall explain the method used to calculate the load rating of each bridge.

AASHTO Load Factor Rating (LFR) shall be utilized for all bridges not designed by Load and Resistance Factor Design. AASHTO Load and Resistance Factor Rating (LRFR) shall be utilized for all structures designed for HL93 loading starting October 2010.

Load Rating Report Submittal to the City or Village shall include:

a. Two (2) printed copies and one electronic pdf copy of the Load Rating Report for each bridge.

b. Final summary of inventory and operating ratings for each member and the overall ratings of the structure shall be presented for each live load truck. An acceptable format is ODOT form BR-100.

c. Analysis program input files. Both input and output files shall be submitted when programs other than BrR or spreadsheets are used.

d. All calculations related to the load rating.

e. If applicable, the weight limits posting recommendations including a copy of the standard posting sign; such as R12-1 (24" x 30"), R12-H5 (30" x 48"), and R12-H7 (30" x 30").

TASK 3 – SMS STRUCTURE INVENTORY AND REVIEW

The scope of this task includes a limited review of the structure inventory data in the ODOT SMS. In general, the CONSULTANT shall review specific existing ODOT bridge inventory records (as provided by the City and approved by ODOT) of the designated bridge. The CONSULTANT may download the inventory report, which contains inventory data for each bridge on file with ODOT from the ODOT website. The CONSULTANT shall verify this data and determine if the ODOT SMS structure file information needs changing. If no changes are necessary, then no SMS inventory needs to be filled out. If changes are necessary, the scope of this task shall also include completing and filing inventory updates (and supplements, as needed) in SMS. The CONSULTANT shall refer to the ODOT Office of Structural Engineering Inventory and Coding Guide of SMS for inventory coding details.

TASK 4 – INSPECTION PROCEDURES

Task 4A – Fracture Critical Plan – A Fracture Critical Member Plan and inspection procedure shall be developed and updated. For more details, refer to Chapter 4: Inspection Types in the Manual of Bridge Inspection. It shall include:

1. Sketches of the superstructure with locations of all fatigue and fracture prone details identified.
   a. Use framing plan or schematic with detail locations labeled and a legend explaining each labeled item on the scheme.

b. Use an elevation view for trusses.
c. Classify similar fatigue/fracture prone details as types (e.g. end of partial cover plate).

2. A table or location of important structural details indicating:
   a. Type of detail (e.g. end of partial cover plate, short web gap, etc.)
   b. Location of each occurrence of detail
   c. AASHTO Fatigue Category of detail
   d. Identify retrofits previously installed

3. Risk Factors Influencing the inspector access.

Photos and sketches shall be properly referenced. The CONSULTANT shall refer to the most recent ODOT Manual of Bridge Inspection for additional details on the scope of this task.

Task 4B – Underwater Inspection Procedures – An underwater inspection procedure shall be developed. For more details, refer to Chapter 4: Underwater Inspections in the Manual of Bridge Inspection. Please note that ODOT has recently revised Appendix F of the inspection manual. The diving team shall fill out or update the new form and upload it on SMS prior to performing the actual dives. Please contact OSE for a copy of a blank form if not uploaded on SMS at the time.

TASK 5 – BRIDGE INSPECTION

Task 5A – Routine Bridge Inspection (SMS Input) - Perform a routine field inspection of the structure to determine the general condition. The CONSULTANT shall refer to the most recent ODOT Manual of Bridge Inspection for additional details on the scope of this task. Section 1111 of the Moving Ahead for Progress in the 21st Century Act (MAP-21) modified 23 U.S.C.144, requires Ohio to report bridge element level data for NBIS bridges on the National Highway System (NHS) to FHWA. A condition rating or element level inspection will be assigned. This task includes: Condition Rating Inspection for non-NBI structures, Condition Rating Inspection for NBI structures, and Element Level Inspection for NBI classified as NHS.

Task 5B – Fracture Critical Inspection - Perform a fracture critical field inspection of fracture critical items. The CONSULTANT shall update the FCM inspection procedure with current photos and descriptions. The CONSULTANT shall refer to the most recent ODOT Manual of Bridge Inspection for additional details on the scope of this task.

Task 5C – Underwater Dive Inspection – Perform Underwater/ In-Water inspection of substructure units according to the cycle shown in SMS. Emergency underwater inspection may arise for specific structures over the duration of the contract period. Work shall be done in accordance with the reference manuals and inspection procedure. Scour risk shall be evaluated after field and data collection.

U.S. Department of Transportation

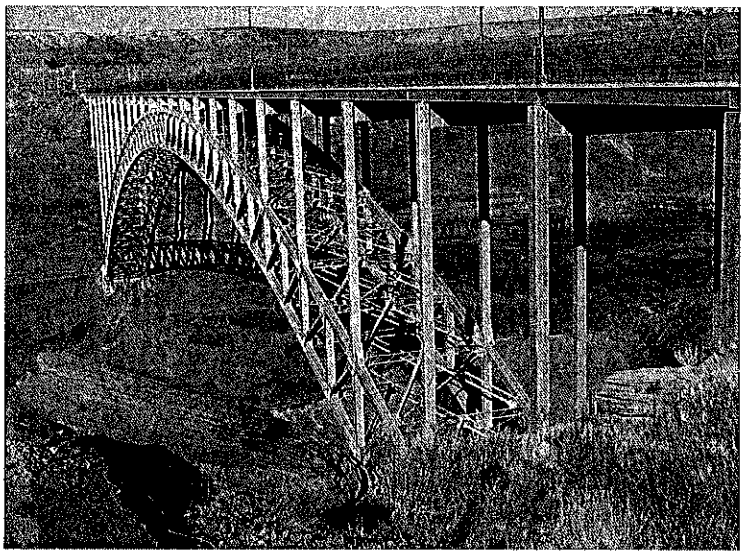
Federal Highway Administration

NBIS Oversight Program

HIBS-30

NBIPOT

Metrics for the Oversight of the National Bridge Inspection Program



May 2017

ToC

National Bridge Inspection Program Metrics

Introduction

This document provides guidance and direction to FHWA Division Bridge Engineers in performing NBIP compliance reviews of State and Federal agency bridge safety inspection programs. It contains the 23 metrics assessed for compliance reviews under the National Bridge Inspection Standards (NBIS) at 23 CFR Part 650, Subpart C. This document supersedes the prior *Metrics for the Oversight of the National Bridge Inspection Program*, dated April 1, 2013.

The format of this document remains the same as the previous version, with each metric definition and requirements listed on one page, followed by a commentary section for each to clarify the metric requirements. The electronic version includes links to other important resources, indicated by blue text.

Further FHWA guidance available on the National Bridge Inspection Program (NBIP) SharePoint site will assist reviewers in performing the compliance reviews, primarily The NBIP Compliance Review Guidance and the BPM Chapter 2 Draft Final 5-1-2017 from the Structure Discipline's Bridge Program Manual. The former contains background and information on the development of the review process and explains the review process generally. The latter document further details how to address the compliance issues determined, such as the requirements of Plans of Corrective Actions, Improvement Plans, and other Non-Compliance issues.

Acronyms and terms used in this document

Compliance Levels

Compliance	C
Substantial Compliance	SC
Non-Compliance	NC
Conditional Compliance	CC

Assessment Levels

Assessment Level	AL
Minimum Assessment Level	Min-AL
Intermediate Assessment	Int-AL
In-Depth Assessment	InD-AL

Other acronyms and terms

AASHTO Manual for Bridge Evaluation	AASHTO Manual or MBE
SharePoint Metric Assessment Reporting Tool (FHWA NBIP tool)	SMART
Bridge Safety Engineer (FHWA)	BSE
Continuing Education Unit	CEU
Division Bridge staff reviewer	reviewer
Federal Highway Administration	FHWA
FHWA Headquarters Bridge Office	HIBS
Fracture Critical Member	FCM
Improvement Plan	IP
Load and Resistance Factor Rating (method)	LRFR
Load Factor Rating (method)	LF or LFR
Load Rating Engineer	LRE
Metric # Assessment Report	MAR#
National Bridge Inspection Program	NBIP
National Bridge Inspection Standards	NBIS
National Bridge Inventory	NBI
National Highway Institute	NHI
National Highway System	NHS
Not to exceed	NTE
Plan of Action (Scour)	POA
Plan of Corrective Action	PCA
Professional Engineer	PE
Program Manager	PM
Quality Assurance	QA
Quality Control	QC
Specialized Hauling Vehicle	SHV
State or Federal Agency	State
Structure Inventory and Appraisal	SI&A
Team Leader	TL
Underwater	UW

Metric #1: Bridge inspection organization

rev 5/1/17

NBIS Reference: 23 CFR 650.307 – Bridge inspection organization

Criteria

- An organization is in place to inspect, or cause to inspect, all highway bridges on public roads.
- Organizational roles and responsibilities are clearly defined and documented for each of the following aspects of the NBIS: policies and procedures, QC/QA, preparation and maintenance of a bridge inventory, bridge inspections, reports, and load ratings.
- Functions delegated to other agencies are clearly defined and the necessary authority is established to take needed action to ensure NBIS compliance.
- A program manager (PM) is assigned the responsibility for the NBIS.

Population: Not applicable.

Compliance Levels

Compliance (C): All of the following must be met for C:

- The organization is in place and effective as indicated by assessment of the other 22 metrics.
- Organizational roles and responsibilities are clearly defined and documented.
- Delegated functions are clearly defined with the necessary authority established.
- Responsibility for the NBIS is assigned to a PM.

Substantial Compliance (SC): All of the following must be met for SC:

- The organization is in place and effective as indicated by assessment of the other 22 metrics; minor deficiencies in the organization exist but do not adversely affect the overall effectiveness of the program and are isolated in nature.
- Organizational roles and responsibilities are clearly defined and documented; isolated deficiencies exist but do not adversely affect the overall effectiveness of the program.
- Delegated functions are defined with authority established to resolve safety issues.
- Responsibility for the NBIS is assigned to a PM.

Non-Compliance (NC): One or more SC criteria are not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Assess based on previous review results, the reviewer's knowledge and awareness of the bridge inspection program, and from the current assessment of the other metrics.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Verify that responsibility for the NBIS is assigned to a PM, and that documented organizational roles, responsibilities, and delegation procedures exist as applicable.
- If functions are delegated, assess effectiveness of the process through interview of PM and some individuals with delegated functions.
- Assess overall effectiveness of organization through assessment of other metrics and interview of PM.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – review in accordance with national direction and guidelines.

General: This metric determines if the State or Federal Agency (State) has an appropriate organization in place, and if the organization is effective as indicated in part by assessment of the other metrics. Therefore, this metric may not be fully assessed until the remaining metrics are fully assessed.

Phrases in italics below are repeated from the metric language, with further explanation provided.

Criteria: The phrase '*Functions delegated to other agencies are clearly defined'* means each State office, District office, contractor, or other entity must be given clear direction for assigned or delegated roles or tasks. For example, a State district office with a delegated PM and inspection teams must understand the extent of their duties and how they are communicated and relate to the main PM in the central office.

The phrase '*...the necessary authority is established to take needed action to ensure NBIS compliance'* means the organization must have agreements with other owners to establish the proper authority necessary to ensure the NBIS is carried out correctly. The State is highly encouraged to establish such agreements in writing. An example of inadequate authority is a State law that prevents proper posting of bridges; this would be considered a compliance issue for Metric 1.

Compliance levels: The term *Safety issues* are those related to bridge closure, posting, critical findings, and overdue inspections. For C, the phrase '*necessary authority established'* is inclusive of these safety issues and all other aspects of delegated functions. For SC, the '*authority established* 'for these safety issues is a minimum.

If other metrics are non-compliant, conduct a careful evaluation to determine whether those non-compliance issues stem from deficiencies in the organizational structure itself. If so, then a finding of SC or NC is appropriate for this metric. This is not directly related to the number of metrics in NC or CC, but whether issues are caused by deficiencies in the organization. Another consideration is if existing PCAs are on schedule, and if not, whether the reason stems from organizational issues.

When inspection staff is not made aware of key components of organizational roles and responsibilities, this can result in inconsistencies in application of QA procedures. In such cases the metric should be considered SC due to organizational deficiency.

Another example of an organization deficiency is when a PM is assigned the responsibility for the NBIS, but with limited authority to ensure delegated agency functions are carried out due to conflicting local laws or policies. The PM has implemented an otherwise good policy to place load posting signs within a specified number of days of a load rating determination, but the bridge owner refuses to post despite repeated attempts by the PM to convince the bridge owner, and the PM is prohibited from posting the bridge directly. In this case the metric is considered NC due to the safety implications.

Assessment levels: At the Min-AL, maintain knowledge and awareness of the programs areas each year to a reasonable degree, through discussion with the PM or others, and remain aware of changes in key personnel or program policies that may affect each metric. The knowledge and awareness from the Min-AL informs whether to perform further review at the Int-AL or InD-AL.

At the Int-AL, consider interviews with individuals who have been delegated PM functions for one or more agencies, districts, consultants, etc., represented in those bridges selected for field review under Metric #12.

Metric #1: Commentary

rev 5/1/17

Background/ changes for PY 2018: *Minor clarifications to wording of metric and addition of commentary to improve clarity. In-D updated for this and all metrics to provide more flexibility to Divisions in further assessment of the metric as necessary.*

Metric #2: Qualifications of personnel – Program Manager

rev 5/1/17

NBIS Reference: 23 CFR 650.309 (a) – Program Manager and 650.313 (g) QC/QA

Criteria

The Program Manager (PM) must have the following qualifications:

- Professional engineer registration or 10 years of bridge inspection experience;
- Successful completion of FHWA approved comprehensive bridge inspection training; and
- Completion of periodic bridge inspection refresher training according to State policy.

Population: The individual designated as PM.

Compliance Levels

Compliance (C): All of the following must be met for C:

- The PM has the required qualifications.
- The PM has completed periodic bridge inspection refresher training according to State policy.

Substantial Compliance (SC): All of the following must be met for SC:

- The PM has the required qualifications, except a newly designated PM has not completed comprehensive bridge inspection training, but is scheduled to do so within 6 months after selection to the PM position.
- The PM has not completed periodic refresher training according to State policy, but is scheduled to do so within the next 12 months.

Non-Compliance (NC): One or more SC criteria are not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Assess based on previous review results, and on the reviewer's knowledge and awareness of the PM's qualifications.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Verify PM's qualifications through interview of PM or PM's direct supervisor(s).
- Review PM's qualification documentation.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

Metric #2: Commentary

rev 5/1/17

General: This metric evaluates the qualifications of the designated State PM, not any other staff members that may have delegated PM duties. The designated PM is ultimately responsible for all aspects of the Program, even if some duties are delegated to districts, consultants, local agencies, or others.

Compliance levels: The term *designated PM* refers to either an acting assignment or a permanent assignment of an individual to the position.

If a PM or an acting PM is qualified, but there are issues relating to lack of overall responsibility, sufficient authority, or effectiveness, this affects the compliance determination for Metric 1 but not Metric 2.

Assessment levels: If a new PM is designated, perform an Int-AL review in the same year if possible, or in the subsequent year if not.

Background/ changes for PY 2018: *Minor changes to wording of metric to improve clarity. Int-AL updated to require review the documentation of PM qualifications and to require Int-AL when a new PM is identified.*

Metric #3: Qualifications of personnel – Team Leader(s) rev 5/1/17

NBIS Reference: 23 CFR 650.309 (b) – Team leader(s) and 650.313 (g) QC/QA

Criteria

Each Team Leader (TL) must have at least one of the following qualifications:

- PE registration
- Five years of bridge inspection experience
- NICET Level III or IV Bridge Safety Inspector certification
- Bachelor degree in engineering from ABET accredited college or university, a passing score on the Fundamentals of Engineering Exam, and two years of bridge inspection experience.
- Associate Degree in engineering from ABET accredited college or university and four-years of bridge inspection experience.

In addition to the above qualifications, TLs must have the following training:

- Successful completion of FHWA approved comprehensive bridge inspection training; and
- Completion of periodic bridge inspection refresher training according to State policy.

Population: All TLs for all inspection types for inspections performed from January 1 of the calendar year prior to the beginning of the review year.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All TLs have the required qualifications.
- All TLs have completed periodic bridge inspection refresher training according to State policy.

Substantial Compliance (SC): All of the following must be met for SC:

- All TLs have the required qualifications.
- One or more TLs have not completed periodic bridge inspection refresher training according to State policy.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Assess based on previous review results, and on the reviewer's knowledge and awareness of process for monitoring TL qualifications.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Randomly sample TLs to review qualifications, including dates of comprehensive and refresher training.
- Interview the PM or supervisor to verify qualifications when documentation of qualifications is inconclusive.

In-Depth Assessment (InD-AL): Perform one of the following

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

General: This metric verifies that all team leaders listed for all types of inspections which require a TL during the identified time period are qualified. Metric #12 then verifies that TLs are on site during each bridge inspection, and that the TLs noted in the inspection reports reviewed are included on the list developed for Metric #3.

Criteria: For additional guidance on what constitutes bridge inspection experience, see the *Questions and Answers on the National Bridge Inspection Standards 23 CFR 650 Subpart C*, located at http://www.fhwa.dot.gov/bridge/nbis/index.cfm.

Population: This metric applies to all TLs for initial, routine, in-depth, fracture critical member, and underwater inspections. The population is limited to TLs that have inspected bridges from January 1 of the calendar year prior to the start of the review year (example: for the PY18 review that starts 4/1/17, include all TLs that have inspected since 1/1/16). This will minimize overlap from one review year to the next.

Compliance levels: Refresher training must be scheduled on a periodic basis. This schedule should be documented, but it does not affect compliance if it is not. If any TL reviewed has not taken refresher training in accordance with State policy, this is considered SC for this metric, notwithstanding other findings. If a TL has never taken refresher training and none is planned, this is also considered SC for this metric, and should be further assessed under Metric 20, pursuant to 23 CFR 650.313(g), which requires periodic refresher training. Such training is not specifically required under 23 CFR 650.309.

Assessment levels: For the Int-AL, use the following procedure to review TL qualifications:

1. If a list of all TLs is available, review qualifications of randomly sampled TLs from the list.
2. If no list is available, refer to the sampling tool's list of sampled bridges for Metrics 13 – 19, and 21. From this sample, in the order of the random numbers already generated, obtain the name of the TL for each bridge inspection until a sample of 19 unique TLs is obtained. If this exceeds the total number of team leaders in the State, review all team leaders.

Because the NBIS does not require a "list" of TLs, the lack of a list does not affect the compliance status for Metric 3. However, in such situations, review documented procedures used to assure that the appropriate inspection qualifications are being met.

If no effective process exists to ensure that all TLs are qualified, but the actual TLs assessed in this metric *are* qualified, this finding should be considered in the compliance determination of Metric 1, not Metric 3. Likewise, if the TLs assessed in this metric are *not* qualified and the State does not have a process to monitor TL qualifications, this finding should be considered in determining the compliance determination for both Metric 1 and Metric 3.

If one or more active TLs are found to be unqualified, the finding should be addressed. First, the PM should ensure that the unqualified individual(s) ceases TL duties. Then work with the PM to develop a plan to ensure that past inspections by the individual(s) were completed in a quality manner, through review of those inspection findings or re-inspections if necessary. The plan should also rectify any underlying process issues that cause unqualified personnel to be assigned TL duties.

If the unqualified TL was found outside the metric process, the finding should also be addressed as described above. If found when Metric 3 was scheduled for a Min-AL, then a review at the Int-AL should be scheduled for that review year if possible, or the following review year at the latest, to

more fully assess the issue. An unqualified TL is considered a high-risk safety issue, so this finding should be applied directly to the compliance level of this metric, and is considered NC. If the underlying issue is resolved by Dec 31, a compliance determination of SC or higher would be appropriate, depending on other issues if any.

If certificates of training cannot be produced and the training was provided by NHI, transcripts can be requested from NHI for courses completed within the past 7 years. Each student's transcript will show the courses attended and the number of CEUs earned – NHI does not print a new copy of a certificate. Send requests for transcripts to NHIRegistrar@dot.gov.

Verify professional engineer registration through the State's PE board website.

Background/ changes for PY 2018: *Minor improvements to wording of metric to improve clarity. Int-AL updated to require interviews of some TLs.*

Metric #4: Qualifications of personnel – Load Rating Engineer

rev 5/1/17

NBIS Reference: 23 CFR 650.309 (c) – Individual responsible for load ratings

Criteria

The Load Rating Engineer has overall responsibility for load rating of bridges and is a registered professional engineer.

Population: The individual charged with overall responsibility for load rating bridges.

Compliance Levels

Compliance (C):
- The LRE is a registered professional engineer.
- The LRE has overall responsibility for load rating of bridges.

Substantial Compliance (SC):
- The LRE is a registered professional engineer.
- The LRE does not have total overall responsibility for load rating of bridges, or the degree of responsibility is not clear.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:
- Monitor PCA if in effect.
- Assess based on previous review results, and on the reviewer's knowledge and awareness of the LRE qualifications and responsibilities.

Intermediate Assessment (Int-AL): Perform the following:
- Verify qualifications and responsibilities of the LRE through interview of LRE or supervisor(s).
- Review LRE's qualification documentation.

In-Depth Assessment (InD-AL): Perform one of the following:
- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

Metric #4: Commentary

rev 5/1/17

General: This metric verifies that the individual designated as the LRE is a registered professional engineer and has overall responsibility for load rating of bridges.

The LRE may be the same individual as the Program Manager and should be actively engaged in determining and communicating load rating policy, load rating QC/QA procedures, etc. Many of the duties of the LRE may be delegated to one or more individuals at lower levels or other agencies, but the overall responsibility for load rating of all bridges in the State ultimately resides with the LRE.

Compliance levels: The phrase *overall responsibility for load rating bridges* does not mean that the individual must complete or review all load ratings directly, but rather that the individual has final responsibility for establishing procedures and guidance for the load rating process in the State, including ensuring the completion of load ratings by local agencies.

A compliance determination of SC is appropriate when the LRE is a PE, but the review reveals the LRE does not have total overall responsibility for load rating of bridges, or the degree of responsibility is not clear. This can occur, for example, if an individual with a PE is designated as the LRE but does not have documented responsibility or have authority to establish necessary policies and practices.

Assessment levels: If a new LRE is designated, perform an Int-AL review in the same year if possible, or in the subsequent year if not.

Background/ changes for PY 2018: *Substantial Compliance criteria was added for this metric, to account for situations where the LRE's level of responsibility is not completely clear. The Int-AL was modified to require review of qualifications by both interviews and reviewing documentation. Minor improvements to wording of metric to improve clarity.*

Metric #5: Qualifications of personnel – UW Bridge Inspection Diver

rev 5/1/17

NBIS Reference: 23 CFR 650.309 (d) – Underwater Bridge Inspection Diver

Criteria

Underwater bridge inspection divers must have successfully completed at least one of the following training courses:

- FHWA approved comprehensive bridge inspection training course
- FHWA approved underwater bridge inspection diver training course

Population: All inspection divers inspecting those bridges from January 1 of the calendar year prior to the beginning of the review year.

Compliance Levels

Compliance (C): The following must be met for C:

- All inspection divers have successfully completed FHWA approved comprehensive bridge inspection training or FHWA approved underwater bridge inspection diver training.

Substantial Compliance (SC):

- All divers listed in the inspection report are qualified, but it is unclear whether all inspection divers were listed due to inadequate documentation of all divers participating in inspections.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Assess based on previous review results, and on the reviewer's knowledge and awareness of process for monitoring underwater bridge inspection diver qualifications.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Randomly sample divers to review documentation of successful completion of required training.
- Interview PM or supervisor if necessary to verify successful completion of required training when documentation is inconclusive.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

General: This metric assesses the qualifications of all underwater bridge inspection divers. The purpose is not to assess all requirements of the team leader; this is done in Metric #3.

Compliance levels: Even though all inspection divers must have completed an FHWA approved comprehensive bridge inspection training course or other FHWA approved underwater diver bridge inspection training course, divers are not required to complete refresher training, unless a diver is also functioning as the team leader for the inspection.

Any diver responsible for inspection of any element must have completed the required training. If only one diver for each inspection meets established criteria, and this diver visually and/or tactilely inspects all underwater components as the primary or only inspector, this is considered a compliance level of C. Additional divers providing support roles only, such as 'tender' divers, need not complete the training.

For SC, any divers listed in the inspection report or other inspection records must meet required qualifications, but there may be cases where all divers may not be listed. Thus, it may be unclear whether every inspection diver that participated in the inspection met the qualifications.

Assessment levels: For the Int-AL, use the following procedure for reviewing diver qualifications:

1. If a list of all divers is available, review qualifications for randomly sampled divers on the list.
2. If no list is available, refer to the Sampling Tool. Use the Metric 17 sample, in the order of the generated random numbers, to obtain the name of the divers for each UW inspection until the required sample size of unique TLs is developed.

Because the NBIS does not require a "list" of TLs and/or underwater bridge inspection divers, the lack of a list does not affect the compliance status for Metric 5. However, in such situations, review documented procedures used to assure that the appropriate inspection qualifications are being met.

If no effective process exists to ensure that all divers are qualified, but the actual divers assessed in this metric are qualified, this finding should be considered in the compliance determination of Metric 1, but not affect the determination for Metric 5.

If certificates of training cannot be produced and the training was provided by NHI, transcripts can be requested from NHI for courses completed within the past 7 years. Each student's transcript will show the courses attended and the number of CEUs earned – NHI does not print a new copy of a certificate. Send request for transcripts to NHIRegistrar@dot.gov.

Background/ changes for PY 2018: *Substantial Compliance criteria was added to account for situations where the qualifications of all divers participating in an inspection are not completely clear. Int-AL updated to include interviews of PM or supervisor if necessary to verify successful completion of required training. Minor improvements to wording of metric to improve clarity.*

Metric #6: Inspection frequency – Routine – Lower risk bridges

rev.5/1/17

NBIS Reference: 23 CFR 650.311 (a) – Routine inspections

Criteria

- Routine inspections are performed at regular intervals not to exceed (NTE) 24 months, or NTE 48 months when adhering to FHWA approved criteria.

Population: Lower risk bridges for the entire State that are open to traffic, and whose inspection dates have changed since the previous year's NBI submission or are overdue.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All bridges are inspected within the required NTE 24 or 48-month interval, as applicable, unless documented unusual circumstances have caused a 1 month delay for any inspections.
- All bridges on the NTE 48-month interval meet the FHWA approved criteria.

Substantial Compliance (SC): All of the following must be met for SC:

- At least 90% of bridges are inspected within the required NTE 24 or 48-month interval plus 1 month, as applicable.
- All bridges are inspected within the required interval plus 4 months.
- At least 95% of the bridges on the NTE 48-month interval meet the FHWA approved criteria.
- Minor deficiencies exist in the documentation process for 1-month inspection delays, or not all delays are properly documented.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Generate MAR6 within 30 days of NBI data acceptance and review to resolve overdue bridge inspections – notify the State of overdue inspections, track completion of inspections, and document result on MAR6.
- Review MAR6 Summary for indication of any new deficiencies.
- Assess based on MAR6 Snapshot and previous review results, and on the reviewer's knowledge and awareness.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Review MAR6 and resolve data for inspections that exceeded the required interval to the extent necessary to assure that the compliance status shown is correct.
- Review a sample of bridges coded for 48-month intervals from the MAR6 list of bridges, to verify they meet the FHWA approved criteria for extended intervals in the State.
- If appropriate, perform a supplemental MAR6 analysis for current year inspections using additional data obtained from the State.
- If 1-month inspection delays exist, review procedures to ensure there is a process to document unusual circumstances and that the process is being followed.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

General: The commentary for Metric 6 also applies to Metrics 7-10, except where noted.

The frequency metrics determine if bridges are being inspected per required intervals, including following FHWA approved criteria for extended intervals, as appropriate. Due to the large numbers of inspections completed each year and the number of scheduling issues that can occur, certain tolerances for each compliance level are defined in each metric.

Metrics 6 & 7 reflect low risk and high risk Routine inspections, Metrics 8 & 9 reflect low risk and high risk Underwater inspections, and Metric 10 reflects FCM inspections. FCM inspections are different from Routine inspections, and although some bridges may be considered in both metrics, the assessment is of two different inspection types. This occurs when, for example, a truss bridge is given a Routine inspection separately from a FCM inspection.

The term *overdue* means the inspection was due prior to the NBI submission date, but a new inspection date was not submitted. This typically occurs either when an inspection was done but was not recorded in the inventory data before submission, or that the inspection has not yet been done. An overdue inspection, until resolved, is considered a high-risk safety issue.

A *delinquent* inspection differs from an overdue inspection in that the inspection was completed but exceeded the required interval.

The analysis includes the 90/180 day NBIS allowance for entering data and an additional 30 days for compiling the submittal.

Population: Risk classification for Metric 6 & 7 is based on the bridge's super/substructure condition, load restriction, and scour vulnerability. NBI Items 41, 63, 64, and 70 determine load restriction risk, which helps identify posted bridges that do not require load restriction and therefore are lower risk. Lower risk criteria for Metric 6:

- NBI Item 59 and 60, or 62 > 4 and
- Either:
  - NBI Item 70 = 5 and Item 63 ≠ 5; or
  - Item 63 = 5 and Item 70 = 5 and Item 41 = A, D, or E
- And Item 113 = 4, 5, 7, 8, 9, N

Bridges adhering to FHWA approved extended frequency criteria are assumed to be lower risk.

The population of all frequency metrics is defined to eliminate review of the same inspection interval for the same bridge in successive review years. It also includes bridges indicated by the submitted data to be overdue for inspection.

Compliance levels: Compliance levels are based on several cumulative thresholds, which allow consideration of unusual circumstances that can make the completion of inspections within the required month impractical or inefficient. The percentages shown in the metric criteria section of the MAR tab represent the compliance level thresholds and are measured when performing an Int-AL.

As identified in the preamble of the NBIS regulation, severe weather, concern for inspector safety, concern for inspection quality, the need to optimize scheduling with other bridges, or other unique situations may be justifiable cause to push the inspection interval into an additional month ($25^{th}/49^{th}$ or $61^{st}/73^{rd}$). Such circumstances must be documented. These thresholds also allow for flexibility so that structures previously inspected earlier than scheduled can get back on the original schedule.

In unusual circumstances that will delay an inspection or group of inspections for more than 1 month, an assessment of C can be made if the Division has provided prior approval with concurrence from

the BSE. Prior to the inspection being delinquent, the State can request FHWA HQ to approval a time extension. If the request is approved, an assessment of C is proper if the bridge(s) is inspected by target date in the extension. Reasons for an extension include but are not limited to: permanently moving a small number of scheduled inspections of low risk bridges to better coincide with existing inspections in the same geographic area or a one-time schedule readjustment due to an unusually large or widespread natural disaster requiring a shift in existing resources.

For C (Metric 6 only), all bridges coded for extended intervals must meet the criteria approved by FHWA for that specific State. At the Int-AL, review and compare the approved criteria with the related data for bridges currently coded for 48 months.

For SC (Metric 6 only), the 5% tolerance for bridges coded for 48 month intervals is intended for those formerly meeting the specific criteria, but transitioning to a 24-month interval due to a recent change in condition or other criterion, which result in SC.

Note that for SC, a 50% threshold is included in the MAR Metric Criteria for the NTE interval. This threshold conveys an expectation that at least half of inspections should be completed on time. Failure to meet the 50% threshold should not by itself result in a non-compliance determination; it may indicate other issues for which further investigation is needed.

Assessment levels:

Min-AL: Resolve all overdue inspections as soon as possible after the NBI data is accepted and the MAR is generated. In this case, resolve means to determine if the overdue inspection has not been done or is only a data issue and take the appropriate action(s) that follow.

If the overdue inspection is a data issue, enter the appropriate override code with an explanation on the MAR data tab.

If a bridge inspection is not completed, take the following actions:

- Notify the State as soon as possible, and work with them to ensure inspection as soon as possible (within 30 days of notification is suggested). If the State does not take expedited action to perform the inspection, discuss the issue with the BSE.
- Track the date that the bridge is inspected
- Enter the appropriate override code with an explanation on the MAR data tab.
- Inform the PM that the underlying issue causing the overdue inspections must be corrected as soon as possible.

Depending on timing and the severity or extent of the underlying issue, the metric should be assessed at the Int-AL, preferably in the current review year, or at the latest in the next year, to determine the full extent of any issues related to the metric.

Document in the FSM the number of overdue bridges resolved, and any actions taken by the State to correct the underlying issue(s).

If any underlying issues are not resolved by December 31, assess as NC. If overdue inspections resulting from rare and isolated situations are completed in a timely manner, with BSE concurrence, and the underlying issues are resolved, the previous year's compliance determination applies, unless additional issues warrant a lower compliance level, or a lack of additional issues and a completed PCA lead to a higher compliance level.

At the Min-AL, compare the MAR summary tab percentages inspected within each threshold to the previous year's levels to determine if any negative trends indicate possible new compliance issues.

Metric #6: Commentary

rev 5/1/17

The MAR summary tab percentages can be shown by pressing the Toggle Assessment Level button to toggle to the Int-AL/InD-AL. Depending on the degree of the apparent compliance issue (based on unresolved summary data), a review at the Int-AL should be scheduled for either the current or the following review year.

Int-AL: Resolve all Overdue inspections as mentioned under the Min-AL, and resolve any other possible compliance deficiencies shown, such as inspections that exceeded the required NTE interval plus 1 month, until it is determined that the MAR compliance snapshot is correct. For further information on resolution of the MAR, see the NBIP – MAR Resolution Guidance.

When warranted, the review can include obtaining the most recent inspection data from the State and performing a supplemental interval analysis. Such analysis should be conducted after consultation with the State and if there is a reasonable chance that current inspections will reveal a higher level of compliance.

To perform a supplemental analysis, generate a new MAR using a current NBI data file (NBI submission file format) as the Most Recent data and the April NBI submission file as the Previous data. The supplemental analysis must cover at least 6 consecutive months or 25% of the population being reviewed, so the supplemental analysis should be performed with a current NBI data file obtained in October or later of the review year. The BSE can assist if such an analysis is needed.

For Metric 6 only, in rare and isolated situations, a small number of bridge inspections may exceed the required interval plus 4 months but no more than 12 months. If these are the only inspections that cause a finding of NC, with the concurrence of the BSE, the reviewer may assess the metric as SC and document the resolution in the MAR and FSM accordingly. Below are some examples to demonstrate this exception:

- An owner has several bridges on a 48-month frequency where the condition worsened, requiring the frequency to be reset to 24 months. The new frequency was recoded, but for two bridges the change was not reflected in the TL's schedule until the following year. Consequently, these bridges were inspected in the 36th month. This is an acceptable, isolated occurrence.
- An owner has a bridge that has been inspected late for 2 cycles in a row, by 7 months and 5 months respectively. This is not an acceptable isolated occurrence.

Metric Assessment Report (MAR): The MAR is generated using the NBIP MARGen tool that is downloaded from the NBIP SharePoint site. The MAR is typically based on the most recent and previous April NBI submissions.

Depending on the summary result, the review may require detailed examination and resolution or overriding of the data, as explained in the MAR instructions on the SharePoint site. The MAR is based on NBI data, which has some known limitations for determining compliance. A few examples include border bridges where the other State has inspection responsibility, when the time frame for processing and submitting NBI data causes some inspection data to be omitted from the submittal, or situations when the bridge has been replaced or work has been performed that changes the inspection schedule.

Background/changes for PY2018: *This metric was updated at the Min AL to no longer require resolution of all possible deficiencies identified in the MAR; only resolution of inspections identified*

as overdue is expected. The Int-AL was modified to require the resolution of all possible deficiencies or until the compliance determination is confirmed, previously required at the Min-AL.

Metric #7: Inspection frequency – Routine – Higher risk bridges

rev 5/1/17

NBIS Reference: 23 CFR 650.311 (a) – Routine inspections

Criteria

- Routine inspections are performed at regular intervals not to exceed (NTE) 24 months.

Population: Higher risk bridges for the entire State that are open to traffic, and whose inspection dates have changed since the previous year's NBI submission or are overdue.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All bridges are inspected within the required NTE 24-month interval, unless documented unusual circumstances have caused a 1-month delay for any inspections.

Substantial Compliance (SC): All of the following must be met for SC:

- At least 95% of bridges are inspected within the required NTE 24 interval plus 1 month.
- 100% of bridges are inspected within the required interval plus 4 months.
- Minor deficiencies exist in the documentation process for 1-month inspection delays, or not all delays are properly documented.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Generate MAR7 within 30 days of NBI data acceptance and review to resolve overdue bridge inspections – notify the State of overdue inspections, track completion, and document result on MAR7.
- Review MAR7 Summary for indication of any new deficiencies.
- Assess based on MAR7 Snapshot and previous review results, and on the reviewer's knowledge and awareness.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Review MAR7 and resolve data to the extent necessary to assure that the compliance status shown is correct.
- If appropriate, perform a supplemental MAR7 analysis for current year inspections using additional data obtained from the State.
- If 1-month inspection delays exist, review procedures to ensure there is a process to document unusual circumstances and that the process is being followed.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

Metric #7: Commentary

rev 5/1/17

General: The commentary for Metric 6 applies to this metric, except where noted.

Population: Risk classification for Metric 7 is based on the bridge's super/substructure condition, load restriction, and scour vulnerability. NBI Items 41, 63, 64, and 70 are used to determine load restriction risk, which helps identify posted bridges that do not require load restriction, and therefore are lower risk. Higher risk criteria for Metric 7:

- NBI Item 59 or 60, or 62 < 5 or
- NBI Item 70 < 5 or
- NBI Item 63=5 and Item 70=5 and Item 41= B, P, or R or
- Item 113 = 0, 1, 2, 3, 6, T or U

Bridges adhering to FHWA approved extended frequency criteria are assumed to be lower risk.

Background/changes for PY2018: *This metric was updated at the Min-AL to no longer require resolution of all possible deficiencies identified in the MAR, only resolution of inspections identified as overdue. The Int-AL was modified to require the resolution of all possible deficiencies or until the compliance determination is confirmed, previously required at the Min-AL.*

Metric #8: Inspection frequency – Underwater – Lower risk bridges

rev 5/1/17

NBIS Reference: 23 CFR 650.311 (b) – Underwater (UW) inspections

Criteria

- UW bridge inspections are performed at regular intervals not to exceed (NTE) 60-months, or NTE 72-months when adhering to FHWA approved UW criteria.

Population: Lower risk bridges requiring UW inspections for the entire state that are open to traffic, with inspection dates changed since previous year's NBI submission or are overdue.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All UW inspections are done within the required NTE 60- or 72-month interval, as applicable, unless documented unusual circumstances have caused a 1-month delay for any inspections.
- All bridges on the NTE 72-month interval, meet the FHWA approved criteria.

Substantial Compliance (SC): All of the following must be met for SC:

- At least 90% of UW inspections are done within the required NTE 60 or 72-month interval plus 1 month, as applicable.
- 100% of UW inspections are done within the required interval plus 4 months.
- At least 95% of UW inspections on NTE 72-month interval meet the FHWA approved criteria.
- Minor deficiencies exist in the documentation process for 1 month UW inspections delays, or not all delays are properly documented.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Generate MAR8 within 30 days of NBI data acceptance and review to resolve overdue UW inspections – notify the State of overdue inspections, track completion, and document result on MAR8.
- Review MAR8 Summary for indication of any new deficiencies.
- Assess based on MAR8 Snapshot and previous review results, and on the reviewer's knowledge and awareness.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Review MAR8 and resolve data to the extent necessary to assure that the compliance status shown is correct.
- Review a sample of bridges coded for 72 month intervals from the MAR8 list of bridges, to verify they meet the FHWA approved criteria for extended intervals in the State.
- If appropriate, perform a supplemental MAR8 analysis for current year UW inspections using additional data obtained from the State.
- If 1-month inspection delays exist, review procedures to ensure there is a process to document unusual circumstances and that the process is being followed.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

Metric #8: Commentary

rev 5/1/17

General: The commentary for Metric 6 applies to this metric, except where noted.

Population: Risk classification for Metric 8 is based on substructure/culvert condition and scour vulnerability. Lower risk criteria for Metric 8:

- 92B = Y
- Item 60 or 62 > 4 and
- Item 113 = 4, 5, 7, 8, or 9

Bridges adhering to FHWA approved extended frequency criteria are assumed to be lower risk.

Compliance levels: For C (Metric 8 only), all bridges coded for extended intervals must meet the criteria approved by FHWA for that specific State. At the Int-AL, review and compare the approved criteria with the related data for bridges currently coded for 72 months.

For SC (Metric 8 only), the 5% tolerance for bridges coded for 72-month intervals is intended for those formerly meeting the specific criteria, but transitioning to a 60-month interval due to a recent change in condition or other criterion, which result in SC.

Assessment levels: For Metric 8 only, in rare situations, a small number of bridge inspections may exceed the required interval plus 4 months but no more than 12 months. If these are the only inspections that cause a finding of NC, with the concurrence of the BSE, the reviewer may assess the metric as SC and document the resolution in the MAR and FSM accordingly. Below is an example to demonstrate this exception:

- An owner has a bridge that is due for an underwater inspection and contracts with a qualified diver to inspect the bridge, but illness of the diver prevents the inspection from taking place on time. By the time the diver recovers, winter conditions further delay the inspection until spring, resulting in it being 8 months late. This would be considered an allowable isolated occurrence.

Background/changes for PY2018: *This metric was updated at the Min-AL to no longer require resolution of all possible deficiencies identified in the MAR, only resolution of inspections identified as overdue. The Int-AL was modified to require the resolution of all possible deficiencies or until the compliance determination is confirmed, previously required at the Min-AL.*

Metric #9: Inspection frequency – Underwater – Higher risk bridges

rev 5/1/17

NBIS Reference: 23 CFR 650.311 (b) – Underwater (UW) inspections

Criteria

- UW inspections are performed at regular intervals not to exceed (NTE) 60 months.

Population: Higher risk bridges requiring UW inspections for the entire state that are open to traffic, with inspection dates changed since previous year's NBI submission or are overdue.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All UW inspections are performed within the required NTE 60-month interval, unless documented unusual circumstances have caused a 1-month delay for any UW inspections.

Substantial Compliance (SC): All of the following must be met for SC:

- At least 95% of UW inspections are performed within the required NTE 60 interval plus 1 month.
- 100% of UW inspections are performed within the required interval plus 4 months.
- Minor deficiencies exist in the documentation process for 1-month inspection delays, or not all delays are properly documented.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Generate MAR9 within 30 days of NBI data acceptance and review to resolve overdue UW inspections – notify the State of overdue inspections, track completion, and document result on MAR9.
- Review MAR9 Summary for indication of any new deficiencies.
- Assess based on MAR9 Snapshot and previous review results, and on the reviewer's knowledge and awareness.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Review MAR9 and resolve data to the extent necessary to assure that the compliance status shown is correct.
- If appropriate, perform a supplemental MAR9 analysis for current year UW inspections using additional data obtained from the State.
- If 1-month inspection delays exist, review procedures to ensure there is a process to document unusual circumstances and that the process is being followed.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

Metric #9: Commentary

rev 5/1/17

General: The commentary for Metric 6 applies to this metric, except where noted.

Population: Risk classification for Metric 9 is based on substructure/culvert condition and scour vulnerability. Higher risk criteria for Metric 9:

- 92B = Y
- NBI Item 60 or 62 < 5 or
- Item 113 = 0, 1, 2, 3, 6, T or U

Bridges adhering to FHWA approved extended frequency criteria are assumed to be lower risk.

Background/changes for PY2018: *This metric was updated at the Min-AL to no longer require resolution of all possible deficiencies identified in the MAR, only resolution of inspections identified as overdue. The Int-AL was modified to require the resolution of all possible deficiencies or until the compliance determination is confirmed, previously required at the Min-AL.*

Metric #10: Inspection frequency – Fracture Critical Member

rev 5/1/17

NBIS Reference: 23 CFR 650.311 (c) – Fracture critical member (FCM)

Criteria

- FCMs are inspected at regular intervals not to exceed (NTE) 24 months.

Population: Bridges that require FCM inspections for the entire State, are open to traffic, and whose FCM inspection dates have changed since the previous year's NBI submission or are overdue.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All FCM inspections are performed within the required NTE 24-month interval, unless documented unusual circumstances have caused a 1month delay for any FCM inspections.

Substantial Compliance (SC): All of the following must be met for SC:

- At least 95% of FCM inspections are performed within the required NTE 24 interval plus 1 month.
- 100% of FCM inspections are performed within the required interval plus 4 months.
- Minor deficiencies exist in the documentation process for 1-month inspection delays, or not all delays are properly documented.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Generate MAR10 within 30 days of NBI data acceptance and review to resolve overdue bridge inspections – notify the State of overdue inspections, track completion, and document result on MAR10.
- Review MAR10 Summary for indication of any new deficiencies.
- Assess based on MAR10 Snapshot and previous review results, and on the reviewer's knowledge and awareness.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Review MAR10 and resolve data to the extent necessary to assure that the compliance status shown is correct.
- If appropriate, perform a supplemental MAR10 analysis for current year inspections using additional data obtained from the State.
- If 1-month inspection delays exist, review procedures to ensure there is a process to document unusual circumstances and that the process is being followed.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

Metric #10: Commentary

rev 5/1/17

General: The commentary for Metric 6 applies to this metric, except where noted.

FCM inspections are different from Routine inspections, and although some bridges may be considered in both metrics, the assessment is of two different inspection types.

Population: Metric 10 is based on bridges identified as requiring a fracture critical member inspection. Criteria for Metric 10:

- Item 92A = Y

Background/changes for PY2018: *This metric was updated at the Min-AL to no longer require resolution of all possible deficiencies identified in the MAR, only resolution of inspections identified as overdue. The Int-AL was modified to require the resolution of all possible deficiencies or until the compliance determination is confirmed, previously required at the Min-AL.*

Metric #11: Inspection frequency – Frequency criteria

rev 5/1/17

NBIS Reference: 23 CFR 650.311 (a)(2), (b)(2), (c)2, (d) – Frequency criteria

Criteria

Criteria is established to determine level of inspection, and frequency for all of the following inspection types where appropriate:

- Routine inspections – for less than 24-month intervals
- FCM inspections – for less than 24-month intervals
- Underwater inspections – for less than 60-month intervals
- Damage inspections
- In-depth inspections
- Special inspections

Population: Bridges meeting established criteria for the entire State, are open to traffic, and whose inspection dates have changed since the previous year's NBI submission or are overdue.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All level of inspection and frequency criteria are established.
- All bridges indicate the appropriate level of inspection and frequency in accordance with the established criteria.

Substantial Compliance (SC): All of the following must be met for SC:

- All level of inspection and frequency criteria are established.
- Records for less than all bridges indicate the appropriate level of inspection and frequency in accordance with the established criteria.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Review MAR11 Summary for indication of any new deficiencies.
- Assess based on previous review results, and the reviewer's knowledge and awareness.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Review established level of inspection and frequency criteria.
- Review MAR11 to resolve data to the extent necessary to assure that the compliance status shown is correct and to discuss any identified issues with the State.
- Obtain or generate a list of all bridges meeting State criteria, and review a random sample from the list to determine adherence to State criteria.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

Metric #11: Commentary

rev 5/1/17

General: This metric ensures there is criteria established for triggering more frequent inspections, and that the criteria is followed.

Criteria: It is understood that a specific frequency is often not established for In-depth and Special inspections, and typically never for Damage inspections; however, criteria for level of inspections should be established for all types.

Compliance levels: If bridge records or MAR resolution indicates that some inspections are found that do not adhere to the established level and frequency criteria, the PM should be notified of the finding and the metric assessed as SC. The finding will not result in NC because there is no direct requirement in the NBIS for the State to follow its own criteria; however, since following it is implied, such a finding is not considered full compliance and therefore is considered SC.

Reasonable documentation for not following the established criteria is acceptable and should be counted as adhering to the criteria.

Assessment levels: For the Min-AL, review the MAR for indication of any new deficiencies, keeping in mind that many shown may reflect limitations in analyzing the NBI data. The MAR information at the Min-AL is for knowledge and awareness only, which should inform whether to perform further review at the Int-AL for either the current or the following review year, to further assess the extent of the issue.

Also for the Int-AL, obtain and review the criteria used by the State, and to the extent possible generate a list of bridges meeting that criteria. Ensure that all bridges are coded for the reduced frequency identified in the policy. The ability to generate a list may be limited to querying any NBI items that may be included in their criteria, which may not capture every aspect of the State's criteria. Alternatively, ask the State to generate the list, and clearly identify the criteria used to develop that list.

Metric Assessment Report (MAR): Generate the MAR using the NBIP MARGen tool available at the NBIP SharePoint site. The MAR is typically based on the most recent and previous April NBI submissions.

The MAR is based on NBI data, which has some known limitations for determining compliance. A few examples include border bridges where the other State has inspection responsibility, when the time frame for processing and submitting NBI data causes some inspection data to be omitted from the submittal, or situations when the bridge has been replaced or work has been performed that changes the inspection schedule.

Background/changes for PY2018: *The Int-AL was modified to bring into the metric an existing requirement to resolve all deficiencies identified in the MAR or until the compliance determination is confirmed.*

Metric #12: Inspection procedures – Quality Inspections

rev 5/1/17

NBIS Reference: 23 CFR 650.313 (a) & (b) Inspection procedures – Quality inspections

Criteria

- Each bridge is inspected in accordance with the *AASHTO Manual for Bridge Evaluation (MBE)*, as measured by the following criteria:
  - condition codes are within generally acceptable tolerances,
  - all notable bridge deficiencies are identified, and
  - condition codes are supported by narrative that appropriately justifies and documents the component condition rating.
- A qualified team leader is at the bridge at all times during each initial, routine, in-depth, fracture critical member and underwater inspection.

Population: Bridges in the State or selected geographic/owner subset that are open to traffic, and have been inspected since January 1 of the previous calendar year.

Compliance Levels

Compliance (C): All of the following must be met for C:

- At least 90% of bridges reviewed meet the criteria for component condition ratings, documentation of deficiencies, and following of applicable MBE procedures.
- All bridges reviewed had a qualified team leader on site during all most recent inspection types.

Substantial Compliance (SC): All of the following must be met for SC:

- At least 80% of bridges reviewed meet criteria for component condition ratings, documentation of deficiencies, and following of applicable MBE procedures.
- All bridges reviewed had a qualified team leader on site during all most recent inspection types.

Non-Compliance (NC): One or more SC criteria are not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Perform field reviews of bridges sampled at a LOC 80%, MOE 15% size or greater, to compare inspection reports for all appropriate inspection types with actual bridge conditions to evaluate:
  1) Accuracy of component condition codes;
  2) Use of MBE procedures;
  3) Adequacy of documentation and appropriate justification of component condition ratings;
  4) Indication that a qualified team leader was present at each applicable inspection, and qualified divers for underwater inspections.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Include field verification of one active Routine inspection to verify team leader presence and that MBE procedures are followed.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines.

General: Metric 12 assesses the quality of bridge inspections. For each sampled bridge, all applicable types of inspection are field reviewed to determine if the inspections:

- Were conducted by qualified team leaders,
- Were performed using proper procedures,
- Resulted in accurate condition codes,
- Resulted in fully documented deficiencies, and
- Included all appropriate inspection types.

Routine bridge inspections, and FCM and UW inspections when appropriate, are assessed. Complex inspection procedures where needed are also assessed. The most recent inspection report(s) for all types are compared to field conditions.

Inspected in accordance with the AASHTO MBE means that inspection processes and techniques described in the MBE Section 4 for Routine, FCM, and UW inspections are generally followed. Verifying the use of MBE procedures through field reviews is generally limited to looking for obvious discrepancies between documented procedures and field observations, such as indications that certain areas were not accessed or that the FCMs or elements requiring an UW were not accessed. Therefore, the primary means of assessing whether MBE procedures were followed, other than participation in the active inspection, is by review of inspection report documentation including photos for evidence that procedures were carried out.

Metric 22 should be assessed along with the Metric 12 field reviews. Metric 12 is focused on the four main condition codes resulting from inspections, the quality of the inspection documentation, and overall quality of the inspection, whereas Metric 22 assesses other NBI data items associated with the bridge record.

Field reviews are not complete and thorough bridge safety inspections. Rather, these reviews should make a reasonable assessment of the overall quality of the most recent inspection and verify, to the extent practical, the previous inspection findings and condition assessments for the accessible parts of the bridge.

If the inspection report identifies findings that cannot be confirmed, those findings should be assumed accurate. However, observed defects or deterioration that are not documented in the report may require further investigation, such as review of prior inspection reports and interviews, before considering the defect an inspection quality issue.

Field reviews should be coordinated with the State PM or other appropriate inspection staff. State or agency participation in the review is strongly encouraged, as this typically leads to a consensus of review findings, informative discussions, and insight into the inspection program. The expectation is that the field review is conducted with State personnel.

In the rare event the State or agency staff do not attend, make every effort to include another FHWA employee, for safety of the reviewer. Discuss with the Division leadership or BSE if someone cannot be found to accompany the reviewer.

Bridges requiring excessive effort or cost due to geography or inaccessibility need not be included in the field review subset.

Population: The population includes all bridges in the State or a geographic or owner subset (if selected by the reviewer) that have had Routine Inspections since January of the previous calendar year prior to the start of the review year. For example, for the PY18 review beginning in April 2017,

the review should only include those bridges having had Routine Inspections during or after January 2016. This will ensure that only recent inspections are reviewed, preventing review of the same structure in subsequent years and identification of older issues that may have since been corrected.

For the sample bridges, the most recent FCM, Underwater, Complex, and other types of inspections also must be included in the review, regardless of when performed (even if prior to January 2016).

Reviewing a subset can reduce the amount of travel required, but all subsets for the entire State must be covered in the 5-year review cycle. The plan for review by subsets must be documented each year under extent of review in the FSM.

Geographic subsets should include all owning agencies within that subset. Rotation of subsets around the State in less than 5 years may be advantageous, allowing flexibility to focus the remaining year(s) of the cycle on reassessment of certain areas or a statewide sample to gain an overall perspective.

Sampling: The minimum number and selection of the field review bridges is based on a statistical randomized sample, largely consistent with other metrics, and retains sampling flexibility for the reviewer. The sample is based on criteria determined to ensure selection of bridges with target risk factors, conditions, and other characteristics. The criteria used by the NBIP Sampling Tool to select the sample bridges and can be found on the NBIP SharePoint site.

The default sample size used by the Tool is Tier 1 (LOC 80%, MOE 15%), with the ability to select a Tier 2 (LOC 80%, MOE 10%) sample size. A larger than Tier 1 sample size may be selected for field review, but the PM must be notified of and understand the reasons for reviewing a larger size, and the larger size must be documented before the review in the 'Extent of Review' field in the FSM. A larger size other than Tier 2 will require manual selection of additional field bridges in the order from the random sample list.

For example, if desired, 20 bridges may be field-reviewed in order to remain consistent with past reviews. When using standard mathematical rounding, the effect of reviewing a Tier 1 sample size vs. 20 will affect the allowable number of inspections beyond the metric tolerances for each compliance level.

The Sampling Tool selects a target number of bridges for each of the Procedure metrics (Metrics 13, 14, 16-19, 21) being reviewed at the Int-AL, if available in the selected geographic area. The tool also selects a target number of bridges in poor, fair, and good condition and on the NHS before rounding out the sample with bridges of any type, condition, or on/off-system.

The random sample may be manually modified in the Sampling Tool after selection. Reasons for replacing a sample bridge with another include but are not limited to replacement, closure, or inaccessibility due to flooding or construction work. However, the next bridge listed in random sample list should be selected in place of the removed bridge. To obtain a different diversity of structure types or other factors, the criteria listed above for structural conditions and procedures metrics being assessed at the Int-AL must first be met. Discuss with the BSE any unique situations where further selection modification is desired. Document the justification for the selection changes in the FSM.

Compliance levels: *Generally acceptable tolerances* for condition assessments exist when the inspector determined NBI condition codes are within one value of the review team's. The team typically includes both FHWA and State staff.

Notable bridge deficiencies are those leading to NBI component ratings of 5 or less, or those requiring some kind of immediate action.

The metric is assessed on a 'per bridge' basis. If all factors are within tolerance as identified on the field review form, then the bridge is a positive data point toward compliance. Conversely, if one or more factors for the bridge are out of tolerance, then the bridge is a negative data point. If 17 of the 18 bridges are positive (or 94.4%), using standard mathematical rounding to 94%, the determination for this metric would be Compliant.

When more than one inspection type was completed, percentages for measuring compliance are still determined based on the number of bridges field reviewed. For example, one bridge may have current inspection reports for routine, FCM, and UW inspections. This package of three reports should be considered one data point. The result of the three inspections should yield one resulting superstructure condition code in the data submittal, and also in the routine inspection report if completed more recently than the fracture critical and underwater inspection reports. If the three reports are judged to have the condition codes (Items 58, 59, and 60, or 62) within acceptable tolerances, it would be a positive data point toward compliance. If 18 bridges identified for field review had 23 current NBIS inspection reports (5 are inspections other than routine), the denominator to use for the percentage calculation should be 18 (not 23). The same logic applies to assessing documentation of notable deficiencies in the three inspection reports.

Condition coding guidance is available in the comprehensive bridge inspection training course, in addition to the Coding Guide and the BIRM. Draw upon all FHWA guidance to determine the proper condition code, understanding the extent and severity of deterioration and effect on structural capacity that is intended for each level of condition. Consult the BSE if a disagreement in the field cannot be resolved.

Appropriate justification of determined ratings means the lower the value of the condition code, the amount of documentation increases to thoroughly describe its location, extent, and significance. While a condition code of 6 may normally warrant a fairly brief narrative, as the condition worsens more thorough documentation is required, which should include photos, sketches, measurements, etc., to fully document the identified deficiencies and support the assigned condition rating. Per the MBE, condition codes of 5 or less require appropriate documentation. If there is lack of documentation for a component rated 6 or greater, this is acceptable, though it is considered good practice to include an appropriate description for components in all conditions.

If findings from an UW or FCM inspection have resulted in a lowering of a condition code, the lowered code and the associated narrative should be reflected in the subsequent Routine inspection report.

If a compliance issue is found in one geographic subset, the issue should be applied to the State compliance determination and an appropriate PCA should be implemented. If in the following year a review is done in a different region yielding no issues, but the PCA for the previous year is not yet complete, the State is still considered to be in non-compliance until the PCA is complete and no other compliance issues have been found.

Assessment levels: Metric 12 assesses, in part, whether a qualified TL was present during the inspection, while team leader qualifications are assessed under Metric 3. Comparing the team leader designated on the inspection report to an approved list of team leaders provided by the program manager is sufficient evidence that a qualified team leader was present. If no qualified team leader as identified by the State is found to have been on site during one or more inspections, Metric 12 is NC, except for the following scenario. If the team leader present at the site is on the State's list of qualified team leaders, but it was found under Metric 3 that the team leader isn't actually qualified, this issue affects compliance for Metric 3 but not Metric 12. However, document the lack of a qualified team leader on site in Metric 12 and explain that the compliance was affected for Metric 3.

At the Min-AL, use the Sampling Tool to determine the field review bridges, which will produce a randomized list based on a predetermined set of factors and, if desired, based on the reviewer's selected (filtered) geographic region. The sample size at the Tier 1 level will likely be between 15 and 19 bridges, depending on the population of State bridges and the sub-population chosen for the geographic area under review. The reviewer should remove any bridges that have been dismantled or replaced, border bridges not under the State's responsibility, or are otherwise inappropriate for review, then use the tool to select the next one(s) on the randomized list. The reason for removal of any bridge from the original randomized list should be documented in the Extent of Review section of the FSM in SMART. Tier 2 or some other larger sample size should be considered in cases where a larger selection would better represent multiple Districts or owning agencies within the State or geographic area.

Assessing Metric 12 along with related Procedure metrics: When a related Procedure metric is being assessed at the Min-AL, regardless of the Metric 12 assessment level, the reviewer is not expected to compare conditions at the site with any bridge-specific procedures in the bridge file. Instead, focus on the overall quality of inspection(s) compared to the inspection report(s), accessibility of bridge members for inspection, and on the other aspects of Metric 12 such as accuracy of the condition codes, supporting narrative, and presence of a team leader. In this case, obvious procedure related inspection quality issues found during the field review, such as a bridge with a pier in deep water and no evidence of an UW inspection being performed on the pier, should be considered Metric 12 findings. However, any finding directly related to a bridge-specific procedure for any Min-AL Procedure metric should add to the reviewer's knowledge and awareness of issues related to that other metric, but should not directly affect the compliance measure for that metric. Discuss particular findings with the PM and document them in the FSM. For serious findings, complete an Int-AL review for the affected Procedure metric in the current or following review year.

When a related Procedure metric is being assessed at the Int-AL, the bridge-specific procedures are to be reviewed under that metric. If evidence is found in the field indicating the bridge-specific procedures were not followed, an inspection quality finding should be applied to Metric 12. On the other hand, if the bridge-specific procedures were followed, but the procedures are found inadequate for the particular bridge, a procedure finding should be applied to the Procedure metric.

Judgement should be applied in determining the effect of an inspection finding on either the Metric 12 or related Procedure metric's compliance measure, taking into account the severity and extent of the finding, the actual effect on inspection quality, and the importance of the specific procedure to inspection quality.

For example, when a bridge-specific procedure has all FCMs identified, but evidence in the inspection report or the field indicates some FCMs were not inspected within arm's reach, the issue should result in an inspection quality finding for Metric 12. However, if some FCMs were not

identified but evidence shows all FCMs were inspected within arm's reach, the issue would result in a bridge-specific procedure finding for Metric 16. If the FCMs were not identified and evidence shows that FCMs were not inspected within arm's reach, the finding should be applied to both Metrics 12 and 16. If the extent of the finding isn't clear, or if it's uncertain which metric(s) apply, discuss with the BSE.

If the most recent UW inspection report is several years old, any findings still apply toward the bridge assessment.

At the Int-AL for Metric 12, include participation in at least one active Routine inspection. Select the bridge(s) manually in consultation with the State, independent of the random sample bridges. For the active inspection(s), observe the inspection process and application of proper procedures. Add the bridge(s) to the random sample as a data point for assessment, but only review the bridge(s) for the Field Form items related to quality of inspection, following of procedures, and qualified team leader presence on the lower portion of the Form. Do not assess the condition ratings and narrative from the previous Routine inspection report, or the ratings and narrative generated from the current inspection. Although the condition ratings and supporting narratives aren't rated on the Field Form for the bridge(s), assess the bridge(s) as a data point with the other bridges for final compliance determination.

Background/ changes for PY 2018: *Revised this metric to make the selection of field bridges based on a random sample, to be more consistent with other metrics. The random sample is based on criteria built into the FHWA Sampling Tool, related to aspects determined to reflect higher risk, to ensure selection of bridges of certain types and in fair to poor condition.*

Metric #13: Inspection procedures – Load Rating

rev 5/1/17

NBIS Reference: 23 CFR 650.313 (c) – Rate each bridge to its safe load-carrying capacity

Criteria

- Bridges are rated for their safe load carrying capacity in accordance with the *AASHTO Manual for Bridge Evaluation (MBE),* for all legal vehicles and State routine permit loads.

Population: All bridges in the State that are open to traffic.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All bridges have a NBI load rating determination.
- All sampled bridges have documentation in accordance with the MBE that supports the load rating determinations.

Substantial Compliance (SC): All of the following must be met for SC:

- 100% of higher risk bridges and at least 95% of lower risk bridges have an NBI load rating determination.
- At least 90% of sampled bridges sampled have documentation in accordance with the MBE that supports the load rating determinations.
- Ratings may have minor or isolated documentation deficiencies, but these do not adversely affect the accuracy of the rating.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Review MAR13 Summary for indication of any new compliance deficiencies.
- Assess based on previous review results, the status of any new compliance deficiencies, and the reviewer's knowledge and awareness of State load rating practices.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Review MAR13 and resolve load rating compliance deficiencies to the extent necessary to assure that the compliance status shown is correct, and discuss identified load rating data inconsistencies with the State.
- Randomly sample bridges identified in the NBI as having load rating determinations and review the load ratings to verify that load rating calculations or documented determinations exist, all legal vehicles were considered, and load ratings are consistent with current conditions.
- Include some bridges from this metric's random sample in the Metric 12 and 22 field review sample, to compare actual bridge conditions with those identified in the load rating.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – conduct in accordance with national direction and guidelines.

General: The NBIS requires all bridges to be rated for safe load capacity, including bridge length culverts.

Population: *Higher risk bridges* for the Load Rating metric are those bridges with:

- NBI condition ratings of 4 (Poor) or less for Superstructure (Item 59), Substructure (Item 60), or Culvert (Item 62)
- Item 70 <5
- NBI appraisal rating of 3 (Serious) or less for Structural Evaluation (Item 67)
- Bridges requiring load restriction (NBI Item 41 coded B, P or R),
- Bridges with temporary supports (NBI Item 41 coded D)
- Bridges with fracture critical members (FCM)

Lower risk bridges for this metric are those that are not classified as higher risk bridges.

Compliance levels: A load rating, as defined in the NBIS, is *the determination of the live load carrying capacity of a bridge using bridge plans and supplemented by information gathered from a field inspection.*

An *NBI load rating determination* means NBI Items 63 and 65 are not equal to 5 (no load rating analysis or evaluation performed).

The 100% and 95% thresholds in the first SC criteria are applied to higher and lower risk bridges, respectively, as analyzed by MAR using the entire State inventory, while the 90% threshold in the second SC criteria is applied to the file review sample, which is reviewed at the Int-AL. The difference in the thresholds reflects the different aspects of assessing inventory load rating data versus the review of a random sample of load rating files.

For SC, *minor or isolated documentation deficiencies* include calculations that are difficult to follow, missing data input; valid but unclear assumptions, etc.

Any NBI reporting deficiencies, including data not reported in the proper format (RF/HS20/HL93), or NBI data not matching the load ratings on file, should be considered for Metric 22.

Per the MBE, ratings should be accurate for current structural and traffic conditions, and material types.

Reasonable timeframes to accomplish a load rating should be acknowledged in assessing compliance. For example, consider a bridge that has recently been identified as needing a rating (or re-rating), but the rating has not yet been done; if the State established timeframe has not been exceeded, this bridge would not be considered as a rating deficiency.

The load rating should consider all legal vehicles when determining if posting is required or not. This can either be done on a per bridge basis, or by parametric analysis for groups of bridges. When the design load rating value does not envelope all legal loads, a rating value must be documented for each vehicle requiring posting.

Assessment levels: Assessment of this metric includes review of MAR for all assessment levels, but to a higher degree at the Int-AL than the Min-AL; it also includes review of a sampling of files, and field reviews at the Int-AL.

The MAR includes all bridges for the metric population, and is based on the most recent and previous April NBI submissions.

The MAR has a *summary* tab and a data tab(s). The data tab(s) details inconsistencies, errors, or compliance deficiencies in the NBI load rating data. The results shown on the *summary* tab should be considered a preliminary assessment of compliance only. Investigation of the data issues, as indicated below, is required. Some issues may be data errors (a Metric 22 issue), while others may relate to the load rating (a Metric 13 issue).

At the Min-AL, the MAR summary tab is reviewed for knowledge and awareness. If new compliance deficiencies are identified that are not being corrected under a PCA, then the metric should be assessed at the Int-AL, preferably in the current review year, or at the latest in the next year, to determine the full extent of any issues related to the metric.

At the Int-AL, the compliance deficiencies identified on the summary and data tabs as red items must be resolved by:

1. Reviewing the data for inconsistencies and errors, resolving as appropriate.
2. Informing the State of any non-resolved compliance deficiencies, and the NC or SC determination based on MAR13.
3. Asking if the State concurs with the NC determination.
   a. If there is concurrence with NC, follow normal procedures for NC.
   b. If there is not concurrence with NC, ask for corrected NBI data or an explanation as to why the metric should not be considered NC. If necessary to achieve resolution, increase the sample size to the Tier 2 level or complete additional investigation at the InD-AL.

The final compliance snapshot on the MAR summary tab after resolution must match the compliance level assigned for the metric.

The data inconsistencies identified in the MAR as yellow items are also evaluated at the Int-AL. Review a few (at least 5 recommended) bridges of these bridges to determine if correction is necessary. Some data inconsistencies could be valid, while others may not be, leading to SC and a resulting Improvement Plan.

File review: At the Int-AL, select a random sample of bridges for file review. *Verify bridges have load rating calculations or that documented determinations exist* and ensure that the results are consistent with other bridge information contained in the file and in the NBI.

Verify load rating calculations, assumptions, and methodology to ensure consistency between calculations and the load rating summary information, suitability of rating vehicles, software program used, etc. Note load rating *assumptions* in the file and verify the actual conditions. Such assumptions include LRFR considerations for condition, significance of or changes to dead load, impact forces, and effectiveness of enforcement.

Evaluation of the load rating file and load rating *policies and procedures* requires familiarity with assigned rating policies (5 conditions in the 9/29/2011 HIBT memo), rating vehicles (including AASHTO's SHVs), and other MBE provisions.

An assigned rating is different than an engineering judgment rating as prescribed in the AASHTO Manual. Engineering judgment is allowed by the MBE in certain circumstances, primarily for concrete or masonry bridges with no plans.

The FHWA Resource Center or Headquarters load rating specialists are available to participate when conducting an Int-AL review.

Field reviews: At the Min-AL, the reviewer should compare field conditions, condition codes, inspection narrative, and design load with the overall load rating, checking only for obvious and substantial discrepancies between them. If a load rating issue is found for bridges field reviewed under Metric 12, it should add to the reviewer's knowledge and awareness for Metric 13. For example, if a load rating for a bridge being reviewed under Metric 12 does not seem to match field conditions, consider reviewing Metric 13 at the Int-AL sooner in the 5-year cycle than previously planned or reviewing at the Tier 2 level to further assess the extent of the issue.

At the Int-AL, the process for determining the number and selection of sample bridges from this metric for inclusion in the field review for Metrics 12 and 22 is covered in Metric 12, and is repeated in part here. The Sampling Tool will automatically select a target number of bridges (see selection criteria on the NBIP SharePoint site for current target number) required under this metric for the Metrics 12 and 22 field reviews, if available in the selected geographic area. If fewer bridges than the target are available, the reviewer is not expected to go outside of the geographic area to review additional bridges.

At the Int-AL for Metric 13 for bridges selected for both field and file review, any field findings can be applied directly to the compliance determination for Metric 13. Actual bridge conditions should be compared to the load rating assumptions, input criteria, etc., such as the percentage of section loss on steel beams.

Also at the Int-AL, evaluate the accuracy and compatibility of other related load rating NBI items listed below for all bridges sampled. If NBI data is inaccurate, this should not directly affect the compliance of Metric 13, since NBI data quality is assessed under Metric 22. Notify the State of any data quality errors, but the data should not directly impact the compliance determination of Metric 22. However, if a widespread data issue is suspected, consider (re)assessing Metric 22 at the Int-AL and including the load rating data item(s) in question.

Load rating NBI items relating to, or which could influence this rating include:

- Item 31 – Design Load
- Items 63-66 – Operating/Inventory Ratings and Methods
- Item 41 – Structure Open, Posted or Closed
- Item 70 – Bridge Posting
- Item 103 – Temporary Structure
- Item 106 – Year Reconstructed
- Item 108 – Wearing Surface

Metric Assessment Report (MAR): The MAR is generated using the NBIP MARGen tool available at the NBIP SharePoint site.

The MAR is based on NBI data, which has some known limitations for determining compliance. A few examples include border bridges where the other State has inspection responsibility, when the time frame for processing and submitting NBI data causes some inspection data to be omitted from the submittal, or situations when the bridge has been replaced or work has been performed that changes the inspection schedule.

Metric #13: Commentary

rev 5/1/17

Background/ changes for PY 2018: *Metric revised to no longer require resolution of all possible deficiencies per the MAR at the Min-AL; several clarifications were made in the Commentary.*

Metric #14: Inspection procedures – Post or Restrict

rev 5/1/17

NBIS Reference: 23 CFR 650.313 (c) Inspection procedures – Post or restrict bridges

Criteria

- Bridges are posted or restricted in accordance with the *AASHTO Manual for Bridge Evaluation (MBE)* or in accordance with State law, when the maximum unrestricted legal loads or State routine permit loads exceed that allowed under the operating rating or equivalent rating factor.
- Posting deficiencies are promptly resolved.

Population: All bridges in the State requiring posting or that are closed.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All bridges are properly posted or restricted.
- All identified posting/closing compliance deficiencies have been promptly resolved.

Substantial Compliance (SC): All of the following must be met for SC:

- All bridges are properly posted or restricted.
- Posting deficiencies have been promptly resolved, but no maximum timeframe for correction has been established or documented.
- Safety Related Checks for bridge posting included in the NBI data check reports are resolved within 90 days of receipt.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Review and notify the State of posting deficiencies identified in the data submittal reports within 30 days of receiving the reports from the NBI administrator.
- Review MAR 14 and resolve all posting deficiencies identified.
- Assess based on previous review results, the status of current posting deficiencies, and the reviewer's knowledge and awareness of State load posting practices.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Randomly sample bridges requiring posting and review the bridge files to verify that the documentation shows posting is properly implemented and corresponds to the load rating recommendation.
- Include some bridges from this metric's random sample in the Metric 12 and 22 field review sample, to verify that posting signs exist and are appropriate for the current load rating and posting recommendations.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines.

Metric #14: Commentary

rev 5/1/17

General: This metric assesses whether bridges are load posted or restricted when the maximum unrestricted legal loads or State routine permit loads exceed those allowed under the operating rating or equivalent rating factor.

Population: Criteria for Metric 14, bridges requiring posting:

- Item 41 = A and (Item 70 < 5 or Item 64 < 20 mT*) or
- Item 41 = B, D, E, K, P or R or
- Item 41 <> K and Item 64 < 2.7 mT*

* Note that the Sampling Tool and MAR generator require Item 64 to be in metric tons, regardless of how submitted. When Items 64 (and 66) are submitted as a rating factor to the NBI, they are converted to and stored as metric tons. When generating a NBI data file, Item 64 (and 66) are output in metric tons.

Compliance levels: The *Safety Related Checks for bridge posting* list bridges with Item 64 between 2.7 and 19.9 mT or Item 41 = 'B'. These checks are included in the *NBI data check reports,* which are generated during processing of the NBI data submittal and sent to the Division and State by the National Bridge and Tunnel Inventory Engineer in the Office of Bridges and Structures. Track the resolution of the Checks to determine the proper compliance level.

Promptly resolved means resolving within the timeframe stipulated in the load posting procedures. The FHWA recommends resolution as soon as possible depending on urgency, up to 90 days if no timeframe has been established. The FHWA selected the default 90-day timeframe after careful consideration of current practice, the safety implications, and what can reasonably be accomplished. However, in cases where known existing loads significantly exceed the recommended posting limit, or the route is of significant importance (bus routes, emergency vehicle routes, etc.), FHWA recognizes that these routes must be posted much more quickly to ensure safety.

It is not possible to eliminate vandalism or impact damage; however, the owner should develop a process to quickly replace or repair such signs upon discovering the problem. For example, some States consider a missing posting sign a critical finding and have established an allowable timeframe to reinstall the sign. Similarly, once determined that a bridge must be restricted for loads, the new signs must be installed promptly. If the owner is able to install the missing, damaged, or new posting signs within the agreed upon timeframe, the deficiency is considered resolved, and a determination of C is warranted. If the owner has no established timeframe, but still promptly resolves the issue, a determination of substantial compliance is warranted. If the owner does not timely address the issue of posting deficiencies, this should be considered NC.

Consider substandard signs, such as those with the proper information but a non-standard font or sign material or not easily readable, to be SC.

Assessment levels: *Resolve all identified posting/closing compliance deficiencies* by following up on identified items and determining if they are just data errors that must be corrected, or if bridges still must be posted. Confirm the accuracy of the data, and resolve any compliance issue(s). If the bridge has since been posted within the established timeframes, this would be considered resolved. If any bridge must be posted and has not been by the established timeframes (or 90 days if no timeframe is established), this is considered NC. Address such situations promptly with the State, and communicate them to the Division Administrator and the Bridge Safety Engineer. Document the current status and eventual resolution of each of these situations in the MAR14, with a copy attached in SMART.

Metric #14: Commentary

rev 5/1/17

At the Min-AL for Metric 14, if a posting issue is found for bridges field reviewed under Metric 12, use this knowledge and awareness to consider another review of Metric 14 at the Int-AL in the current or following review year, to further assess the extent of the issue. Discuss particular findings with the State for prompt resolution.

At the Int-AL, the process for determining the number and selection of sample bridges from this metric for inclusion in the field review for Metrics 12 and 22 is covered in Metric 12, and is in part repeated here. The Sampling Tool will automatically select a target number of bridges from this metric for the Metrics 12 and 22 field reviews if available in the selected geographic area (see selection criteria on the NBIP SharePoint site). If fewer than the target are available, the reviewer is not expected to go outside of the geographic area to review additional bridges.

At the Int-AL for Metric 14, for bridges selected for both field and file review, any field findings can be applied directly to the compliance determination for Metric 14.

Load posting NBI items are those related to or could influence this topic: Item 31 – Design Load; Items 63-66 – Operating/Inventory Ratings and Methods; Item 41 – Structure Open, Posted, or Closed; Item 70 – Bridge Posting; Item 103 – Temporary Structure. At the Int-ALs these items are reviewed during field reviews for compatibility between items and for accuracy. The reviewer should include these items as part of an Int-AL of Metric 22 when this level of assessment is undertaken for Metric 14.

In some cases, bridges on the Metric 14 sample that need posting are coded 'R' for Item 41—these are often parkway bridges with ample load capacity for the trucks allowed on the parkway. In these cases, if the operating rating meets or exceeds the force effects from all allowable truck loads on that route, and heavier trucks are restricted by some other method than load posting each bridge, then the code of 'R' is sufficient to indicate that the bridge is restricted and does not need to be individually posted.

Metric Assessment Report (MAR): The MAR includes all bridges for the metric population, based on the most recent and previous April NBI submissions.

The MAR has a *summary* tab and a data tab(s). The data tab shows the bridge-by-bridge posting status based on several evaluations using NBI Items 41, 64, 70, 103, and 59-60 or 62 in the most recent and the previous year's NBI submissions. It also has a *Bridge Compliance Status* indicator showing the overall posting status of the bridges. The *summary* tab summarizes the evaluation data on the data tab and provides an *Overall Compliance Snapshot* based on a summary of the *Bridge Compliance Status* indicator.

For all assessment levels, the *Bridge Compliance Status* of all bridges evaluated as *not properly posted or restricted* must be resolved. The data tab provides columns for manually overriding the evaluation result and for providing comments or explanations based on the review.

Posting/closing compliance deficiencies are those identified as red items in the MAR. (Note: These include the "safety related checks" of the NBI submission, but also incorporate more data checks).

MAR *data inconsistencies and errors* are those identified as yellow items in the report.

Background/changes for PY2018: *Clarifications were made to commentary.*

Metric #15: Inspection procedures – Bridge Files

rev 5/1/17

NBIS Reference: 23 CFR 650.313 (d) – Prepare bridge files

Criteria

- Bridge files are prepared and significant bridge file components recorded as described in the AASHTO MBE.

Population: Bridges for the entire State that are open to traffic.

Compliance Levels

Compliance (C): All of the following must be met for C:
- All sampled bridges have files.
- All sampled files have the applicable significant components.

Substantial Compliance (SC): All of the following must be met for SC:
- All sampled bridges have files.
- At least 85% of sampled bridge files have the applicable significant components.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:
- Monitor PCA if in effect.
- Assess based on previous review results and the reviewer's knowledge and awareness of State's practices.

Intermediate Assessment (Int-AL): In addition to the Min-AL:
- Randomly sample bridges to verify that bridge files and significant bridge file components exist; if some components are only referenced, verify the components exist in the referenced location(s) and are readily available.

In-Depth Assessment (InD-AL): In-Depth Assessment (InD-AL): Perform one of the following:
- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines

General: As outlined in Section 2 of the AASHTO Manual (MBE), the bridge file contains a wide range of information applicable to bridge inspection which may be located in more than one location. The list of *applicable significant bridge file components* for Metric 15, which is a subset of the larger list provided in the MBE is composed of:

- Inspection reports
- Waterway information – channel cross-sections, soundings, stream profiles
- Special inspection procedures or requirements
- Load rating documentation, including load testing results
- Posting documentation
- Critical findings and actions taken
- Scour assessment
- Scour Plan of Action (POA) (for scour critical bridges and those with unknown foundations) and documentation of post-event inspection or follow-up
- Inventory and evaluation data and collection/verification forms
- Significant correspondence

Per the NBIS, bridge files must also contain maintenance records.

Channel cross-sections must be included in the bridge file per section 4.8.7 of the AASHTO MBE. The FHWA interprets the MBE provision to apply to all bridges, including floorless culverts, spanning a waterway. Cross sections include vertical measurements from identified points on the upstream and downstream face(s) of the structure to the stream bottom or embankment at each abutment and at other substructure walls or piers at a minimum. A single cross section at one face may be appropriate for historically stable channels and embankments. Cross sections must be updated periodically so that a historical comparison is available in the file to help determine the extent of any scour, channel shifting, degradation, or aggradation of the stream. A frequency for obtaining and updating these measurements should be established, depending on an assessment of the bridge and stream characteristics, and documented in the bridge file. Evaluate the need for obtaining cross sections for pipes and box culverts that meet the definition of a bridge under the NBIS on a case-by-case basis.

Significant correspondence refers to correspondence and agreements regarding inspection responsibility, ownership, maintenance responsibilities with other agencies, or other issues that have an impact on the ability to ensure that thorough and timely inspections are completed.

For additional information on particular aspects or considerations relating to the significant file components, consult Section 2 of the AASHTO MBE.

Some significant components require retention of historical information, such as inspection reports, channel cross-section, etc. If the historical aspect of these components is found deficient, such as lack of past cross-section information, the remedy of this practice through an improvement plan or plan of corrective action will only change future documentation. Future year assessments should consider these recent improvements and their effectiveness of procedures moving forward in time in evaluating the adequacy of these components, and not require full histories that are unrecoverable. Another scenario is if files have been destroyed by a natural disaster, the previous files should be re-created to the extent possible from electronic or duplicate copies that may exist elsewhere, and from that time going forward the new file contents should be complete.

Metric #15: Commentary rev 5/1/17

Compliance levels: Percentages for determining metric compliance should be calculated by considering each bridge file as one data point. Each of the significant components listed above and relevant maintenance and inspection data are the minimum requirements. Those components that do not apply to that particular bridge do not affect compliance for that bridge. For example, a scour assessment is not necessary if the bridge is not over water; no posting documentation is necessary if calculated load capacities were sufficient; etc.

For another example, when reviewing a sample of 19 bridges at the Int-AL, 1 bridge file is missing a required scour assessment; a second is missing both the load rating calculations and the stream cross-sections for a scour critical bridge; and the remaining bridge files are complete. The compliance percentage would be calculated as 17/19, or 89.5%, yielding a substantial compliance determination for the metric.

Assessment levels: Most of the components of a bridge file should be in the same location; however, if there are items that are not included in the bridge file, the file should reference where the information is located. The bridge file can be electronic, hard-copy, or a combination of both, as determined by the State's policies. Bridge files, or parts thereof, might be located in district or region offices for agencies that have a de-centralized organizational structure. These files may be reviewed electronically, by requesting mailed copies, or by visiting the remote offices.

Background/ changes for PY 2018: *Minor editorial corrections made, and clarification on channel cross sections and relevant maintenance data.*

Metric #16: Inspection procedures – Fracture Critical Members rev 5/1/17

NBIS Reference: 23 CFR 650.313 (e) (1) – Bridges with fracture critical members (FCMs)

Criteria

- Bridges with FCMs have the following:
  - location of all FCMs identified
  - inspection frequency
  - inspection procedures
- FCMs are inspected according to those procedures.

Population: Bridges for the entire State with FCMs that are open to traffic.

Compliance Levels

Compliance (C): All of the following must be met for C:
- All sampled bridges with FCMs have documented inspection procedures.
- All sampled bridges with FCMs are inspected according to those procedures.

Substantial Compliance (SC): All of the following must be met for SC:
- All sampled bridges with FCMs have documented inspection procedures; the procedures may have minor or isolated deficiencies that do not adversely affect the effectiveness of the FCM inspections.
- All sampled bridges with FCMs are inspected according to those procedures.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:
- Monitor PCA if in effect.
- Assess based on previous review results and the reviewer's knowledge and awareness of State's FCM inspection practices.

Intermediate Assessment (Int-AL): In addition to the Min-AL:
- Randomly sample bridges to verify that sample FCM bridge files contain inspection procedures, and the FCM inspection report indicates the bridge was inspected according to those procedures.
- Include some bridges from this metric's random sample in the Metric 12 and 22 field review sample, to verify documented procedures were followed.

In-Depth Assessment (InD-AL): Perform one of the following:
- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines.

General: FCMs must be inspected according to the documented inspection procedures for the bridge, which should contribute to thorough inspections yielding accurate condition assessments.

Risk factors to consider for inspection procedures include, but are not limited to:

- fatigue and fracture prone details
- problematic materials
- poor welding techniques
- potential out-of-plane distortion details
- previous cracking or repairs
- source of prior cracking
- cold service temperatures
- load posted
- superstructure condition code of 4 or less
- subject to overloads or impact damage
- older service life
- removal of debris
- high ADTT (either ADTT>5,000 or State defined criteria)

Knowledge of the source of prior cracking, such as load induced, distortion induced, constraint induced (pop-in fracture), or fabrication flaws (hydrogen, weld defect, etc.), can determine proper inspection procedures. Load induced is typically the most predictable, whereas the others are less predictable (with more inherent risk). The lowest anticipated service temperature is an important factor in determining susceptibility to cracking.

Bridges posted because of a controlling FCM, which may include deterioration, also warrant special attention. In general, evaluate the appropriateness of the prescribed procedures for any identified risk factors.

The non-redundant nature of FCMs, especially when coupled with risk factors, leads to a heightened concern for the performance of these members. By identifying these conditions or risk factors, the inspectors of FCMs can appropriately prepare for, and perform, a thorough inspection. Accordingly, the reviewer should, for those bridges selected from this metric for field review, look for the presence of risk factors at each site and evaluate whether the FCM inspection procedures and the inspection reports adequately address them.

Compliance levels: *Minor or isolated deficiencies* with FCM inspection procedures are those that could be improved to make the inspection more efficient or effective, or relate to better documentation of the report or the procedures. For example, ultrasonic inspection methods might be listed, but it is unclear which members will receive UT. However, the identification of FCMs, frequency of inspection, and knowing the risk factors present are all critical items, and deficiencies in these are not considered minor.

Assessment levels: Documented inspection procedures are those procedures required in the NBIS for specific types of more complex inspections, in this case for FCMs, to address those items that need to be communicated to the inspection team leader to ensure a successful inspection. These inspections must be planned and prepared for, identifying and accounting for each fracture critical member, needed access, inspection equipment, risk factors present (as detailed above), inspection methods and frequencies, and the required qualifications of inspecting personnel.

The AASHTO MBE, Section 4, has general considerations regarding inspection plans. An owner may have general overall inspection procedures in their bridge inspection manual which address common aspects of FCM inspections; however, each bridge with FCMs must have written inspection procedures specific to that bridge which address items unique to that bridge, if any. The prior inspection report is valuable to review for previous inspection findings, but often does not serve the

same purpose as the inspection procedures. The inspection report records what an inspector actually did, what was looked at, and what was found. Procedures lay out what should be done, looked at, etc. However, the required procedures may be incorporated into each report, often as an introductory section. This is an acceptable practice.

At the Min-AL for Metric 16, any State bridge-specific FCM procedures need not be assessed during the field reviews of any bridges under Metric 12 that may include FCMs. If an issue is found regarding a bridge-specific FCM inspection procedure for bridges field reviewed under Metric 12, it should add to the reviewer's knowledge and awareness toward Metric 16. Consider reviewing Metric 16 at the Int-AL in the current or following review year, to further assess the extent of the issue. Discuss particular findings with the State and document them in the FSM.

Conversely, at the Int-AL for Metric 16, for bridges selected for both field and file review, any field findings should be applied directly to the compliance determination for Metric 16.

For file review sampled bridges, evaluate the FCM inspection procedures for compatibility with the inspection reports and the bridge plans.

At the Int-AL, the process for determining the number and selection of sample bridges from this metric for inclusion in the field review for Metrics 12 and 22 is covered in Metric 12, and is repeated here in part. The Sampling Tool will automatically select a target number of bridges from this metric for the Metrics 12 and 22 field reviews if available in the selected geographic area (see selection criteria on the NBIP SharePoint site for field bridge selection). If fewer than the target are available, the reviewer is not expected to go outside of the geographic area to review additional bridges.

Background/ changes for PY 2018: *Clarifications to field review selection and other clarifications were made.*

Metric #17: Inspection procedures – Underwater rev 5/1/17

NBIS Reference: 23 CFR 650.313 (e)(2) – Bridges requiring underwater (UW) inspections

Criteria

- Bridges requiring UW inspection have the following:
  - location of all UW inspection elements identified
  - inspection frequency
  - inspection procedures
- UW elements are inspected according to those procedures.

Population: Bridges for the entire State requiring underwater inspection that are open to traffic.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All sampled bridges requiring UW inspection have documented inspection procedures.
- All sampled bridges requiring UW inspections are inspected according to those procedures.

Substantial Compliance (SC): All of the following must be met for SC:

- At least 90% of sampled bridges requiring UW inspections have documented inspection procedures; procedures may have minor or isolated deficiencies, but the deficiencies do not adversely affect the effectiveness of the UW inspections.
- At least 90% of sampled bridges requiring UW inspections are inspected according to those procedures.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Assess based on previous review results and the reviewer's knowledge and awareness of State's UW inspection practices.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Randomly sample bridges to verify that files contain UW inspection procedures, and the UW inspection report shows that the bridge was inspected according to those procedures.
- Include some bridges from this metric's random sample in the Metric 12 and 22 field review sample, to verify documented procedures were followed.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines.

General: UW inspection must be performed according to the documented inspection procedures for the bridge, which should contribute to thorough inspections yielding accurate condition assessments.

Documented UW inspection procedures are those procedures required in the NBIS for specific types of more complex inspections, in this case for underwater elements, to address those items that must be communicated to the inspection team leader to ensure a successful inspection. These inspections must be planned and prepared for, taking into account identified underwater elements, physical scour countermeasures, needed access, inspection equipment, structural details, hydraulic features and characteristics, risk factors (as detailed below), inspection methods and frequencies, and the required qualifications of inspecting personnel.

Other items that may be addressed, if applicable, are: special contracting procedures prior to inspection (Coast Guard, etc.) and scheduling considerations (lake draw down, canal dry time, etc.). The AASHTO MBE, Section 4, gives general considerations regarding inspection plans.

An owner may have general overall inspection procedures in the bridge inspection manual that address common aspects of underwater inspections; however, each bridge with elements requiring underwater inspection must have written inspection procedures specific to each bridge that address items unique to that bridge. The prior inspection report is valuable to review for previous inspection findings, but most often does not serve the same purpose as the inspection procedures. The inspection report records what an inspector actually did, what was looked at, and what was found. Procedures lay out what should be done, looked at, etc. However, the required procedures may be incorporated into the report, often as an introductory section. This is an acceptable practice.

This metric considers the risks of bridges which cross over waterways. The development of good inspection procedures and concerted attention to follow those procedures will mitigate most of those risks. In addition, the risk of scour for scour critical bridges or bridges with unknown foundations is mitigated by development and implementation of a scour plan of action (POA) for each bridge.

Compliance levels: Specific risk factors include waterway features that may promote scour and undermining of substructure elements, such as, but not limited to:

- rapid stream flows
- significant debris accumulation
- constricted waterway openings
- soft or unstable streambeds
- meandering channels

Water conditions that may affect the inspection, such as black water or rapid stream flows, should be identified and accounted for in the inspection methods. The procedures should identify water environment and structural systems or materials that may accelerate deterioration of the bridge elements. These factors include highly corrosive water, unprotected steel members, timber piling in the presence of teredos or limnoria, etc. By identifying these conditions, the underwater inspectors can appropriately prepare for and perform a thorough inspection.

Metric #17: Commentary

rev 5/1/17

For bridges sampled for field and/or file review, look for any evidence of risk factors or unique circumstances or conditions at each site by reviewing the inspection report, plans, etc., and comparing them with the inspection procedures. The field review should verify underwater inspection access requirements, if possible.

Assessment levels: At the Min-AL for Metric 17, any State bridge-specific procedures need not be assessed during the field reviews of any bridges under Metric 12, which may include bridges requiring underwater inspections. If a specific underwater inspection procedure issue is found for bridges field reviewed under Metric 12, it should add to the reviewer's knowledge and awareness toward Metric 17, and consider reviewing Metric 17 at the Int-AL in the current or following review year, to further assess the extent of the issue. Discuss particular findings with the State and document them in the FSM.

Conversely, at the Int-AL for Metric 17, for bridges selected by the sampling tool for both field and file review, any field findings should be applied directly to the compliance determination for Metric 17.

At the Int-AL, the process for determining the number and selection of sample bridges from this metric for inclusion in the field review for Metrics 12 and 22 is covered in Metric 12, and is in part repeated here. The Sampling Tool will automatically select a target number of bridges from this metric for the Metrics 12 and 22 field reviews, if available in the selected geographic area (see selection criteria on the NBIP SharePoint site for field bridge selection). If fewer than the target are available, the reviewer is not expected to go outside of the geographic area to review additional bridges.

Background/ changes for PY 2018: *No substantial changes were made to this metric. Minor clarifications and editorial corrections were made.*

Metric #18: Inspection procedures – Scour

rev 5/1/17

NBIS Reference: 23 CFR 650.313 (e), (e3) Bridges that are scour critical

Criteria

- Bridges over water have a documented evaluation of scour vulnerability.
- Bridges that are scour critical have a scour plan of action (POA) prepared to monitor known and potential deficiencies and to address scour critical findings.
- Bridges that are scour critical are monitored in accordance with the POA.

Population: Bridges for the entire State that are over water and open to traffic.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All bridges over water have a scour evaluation as indicated by NBI scour coding.
- All sampled bridges have a documented scour evaluation assessing scour vulnerability.
- All sampled bridges that are scour critical or with unknown foundations have a scour POA.
- All sampled bridges subject to a triggering event are monitored in accordance with the POA.

Substantial Compliance (SC): All of the following must be met for SC:

- All bridges over water have a scour evaluation as indicated by NBI scour coding.
- All sampled bridges over water have a documented scour evaluation assessing scour vulnerability, but some evaluations may have minor or isolated deficiencies that do not adversely affect the assessment.
- All sampled bridges that are scour critical or with unknown foundations have a POA, but some may have minor or isolated deficiencies that do not adversely affect the POA effectiveness.
- All sampled scour critical bridges subject to a triggering event are monitored in accordance with the POA, but minor deficiencies in documentation of monitoring may exist.

Non-Compliance (NC): One or more SC criteria are not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Review MAR18 Summary and resolve previously identified unevaluated bridges.
- Assess based on previous review results, the status of any new compliance deficiencies, and from the reviewer's knowledge and awareness of the State's processes and practices.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Randomly sample bridges to review files to verify that scour evaluations are documented, consistent with bridge conditions, and properly assess scour vulnerability.
- From the random sample, verify that POAs are developed and documented for those that are scour critical or have unknown foundations.
- Include some bridges from this metric's random sample in the Metric 12 and 22 field review sample, to verify validity of scour evaluations.
- If a triggering event has occurred to a sampled bridge during the 2-year period prior to the year of assessment, review file and conduct interviews as necessary to verify that monitoring was executed in accordance with POA.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines.

Metric #18: Commentary

rev 5/1/17

Population: Metric 18 criteria:

Criteria for bridges requiring scour evaluation:

- Item 42B = 5, 6, 7, 8, 9 (all bridges over waterways) or
- Item 113 < or > N

Criteria for bridges requiring a scour POA:

- Item 113 < 4 (scour critical bridges) or
- Item 113 = U (bridges over water with unknown foundations)

Compliance levels: POA *deficiencies* leading to a SC determination could be either lack of adequate documentation or ineffective monitoring. Lack of documentation could include inadequate or outdated information for emergency contacts, scour information, etc.

A *documented scour evaluation* should be a report with calculations, a documented assessment, or documented screening process explaining how the Item 113 value was determined. This evaluation should be available for every bridge over water.

Ineffective monitoring could involve situations where monitoring thresholds are poorly chosen or not clearly identified, or there was some confusion on what to monitor for or in what priority.

SC instances represent minor or isolated situations. POAs with major or significant shortcomings that render them useless for mitigating scour risks are NC findings.

Assessment levels: *Previously identified unevaluated bridges* in the MAR are those which have been coded as 6/ T/ null in Item 113 – Scour Critical Bridges. The resolution of these items at the Min-AL is to verify that those bridges have been evaluated for scour.

At the Min-AL for Metric 18, any State bridge-specific procedures need not be assessed during the field reviews of any bridges under Metric 12, which may include bridges that are scour critical and require a POA. If a specific issue related to Metric 18 is found for bridges field reviewed under Metric 12, it should add to the reviewer's knowledge and awareness of compliance toward Metric 18, and consider reviewing Metric 18 at the Int-AL in the current or following review year, to further assess the extent of the issue. Discuss particular findings with the State and document them in the FSM.

Conversely, at the Int-AL for Metric 18, for bridges selected for both field and file review, any field findings should be applied directly to the compliance determination for Metric 18.

At the Int-AL, the process for determining the number and selection of sample bridges from this metric for inclusion in the field review for Metrics 12 and 22 is covered in Metric 12, and is repeated here in part. The Sampling Tool will automatically select a target number of bridges from this metric for the Metrics 12 and 22 field reviews if available in the selected geographic area (see selection criteria on the NBIP SharePoint site for field bridge selection). If fewer than the target are available, the reviewer is not expected to go outside of the geographic area to review additional bridges.

At the Int-AL, the field review of the sampled bridges should verify scour vulnerability coding compared to actual conditions, in addition to the other aspects of field review conducted under Metric 12 and 22. Also, for bridges requiring a scour POA, evaluate conditions on site to determine compatibility to the actions required in the plan. If a scour 'triggering event' has occurred within the

2-year period prior to the year of assessment (2 full calendar years prior), then determine if the POA was followed through record review, and through interview if the records are inconclusive.

Metric Assessment Report (MAR): The MAR includes all bridges over waterways for the metric population, based on the most recent and previous April NBI submissions.

The MAR has a summary tab and a data tab. The data tab shows the status of each bridge based on NBI Item 113 in the most recent and the previous year's NBI submissions. It also indicates whether a POA is required (if the bridge is scour critical or has an unknown foundation).

For all assessment levels, the status of all bridges listed as *not evaluated* (NBI Item 113 code = '6' or blank), identified as red items, must be resolved. The data tab provides columns for overriding the result and for providing comments or explanations based on the review.

For newly constructed or acquired bridges, a scour evaluation may be completed up to 1 year after acquisition.

Background/ changes for PY 2018: *The population for this metric now applies to all bridges over water when assessing completion of scour evaluations. Previous assessment at the Int-AL only applied to bridges evaluated as scour critical, not yet evaluated, or having unknown foundations. The Min-AL no longer requires verification of POAs for scour critical bridges.*

Metric #19: Inspection procedures – Complex Bridges

rev 5/1/17

NBIS Reference: 23 CFR 650.313 (f) – Complex bridges

Criteria

- Complex bridges have the following identified:
  - specialized inspection procedures
  - additional inspector experience and training
- Complex bridges are inspected according to the procedures.

Population: Bridges for the entire State that are complex bridge types that are open to traffic.

Compliance Levels

Compliance (C): All of the following must be met for C:

- All sampled complex bridges have specialized documented inspection procedures, and have any required additional inspector training and experience identified.
- All sampled complex bridges are inspected according to the specialized procedures, and inspectors of those bridges have the identified additional training and experience.

Substantial Compliance (SC): All of the following must be met for SC:

- At least 90% of sampled complex bridges have specialized documented inspection procedures, and have any required additional inspector training and experience identified.
- At least 90% of sampled complex bridges are inspected according to the specialized procedures, and inspectors have the identified additional training and experience.

Non-Compliance (NC): One or more SC criteria not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Assess based on previous review results and the reviewer's knowledge and awareness of complex bridge inspection procedures.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Randomly sample bridge files to verify that bridges have documented specialized inspection procedures, and that any additional inspector training and experience has been identified and met.
- Review sample bridge reports to verify that documented procedures were followed.
- Include some bridges from this metric's random sample in the Metric 12 and 22 field review sample, to verify documented procedures were followed.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines.

General: *Complex features* found in complex bridges include, but are not limited to:

- suspension cables
- stay cables
- anchorages of cables and post-tensioning
- electrical systems
- mechanical systems
- operational systems and controls
- other unusual characteristics which may include:
  - floating bridge components
  - materials with known problems
  - special seismic features

Features may be considered complex due to design, constructability, and/or inspectability issues.

Complex bridges must be inspected according to the written inspection procedures for the bridge and by inspectors with the additional training and experience specified. This should result in thorough inspections yielding accurate condition assessments.

Specific risk factors include, but are not limited to:

- complex structural response
- difficult to access
- specialized inspection equipment needs
- high ADT & ADTT
- low redundancy
- history of past problems

By identifying these conditions or risk factors in the inspection procedures, the complex bridge inspectors can appropriately prepare for and perform a thorough inspection.

Population: Complex bridges are defined in the NBIS as movable, suspension, cable stayed, and other bridges with unusual characteristics. Criteria for Metric 19:

- Item 43B = 13, 14, 15, 16, or 17

States have the flexibility to define additional bridges considered complex because of unusual characteristics. If additional bridge types are considered complex, include them in the population.

Compliance levels: Acceptable *specialized documented inspection procedures* are required in the NBIS for specific types of more complex inspections, including for complex bridges. Such procedures address items that must be communicated to the inspection team leader to ensure a successful inspection. These inspections must be planned and prepared for, taking into account identified complex features (detailed above), risk factors (detailed above), inspection methods and frequencies, and the required qualifications of inspecting personnel. The AASHTO MBE, Section 4, discusses general considerations regarding inspection plans.

An owner may include general inspection procedures in the bridge inspection manual that address common aspects of inspecting particular features; however, each complex bridge with unique elements requiring special inspection must have specific written inspection procedures. These procedures must identify which features have unusual characteristics and detail how to inspect them. The prior inspection report is valuable to review for previous inspection findings, but most often does not serve the same purpose as the inspection procedures. The inspection report records what an inspector actually did, what was looked at, and what was found. Procedures lay out what should be done, looked at, etc. However, the required procedures may be incorporated into the report, often as an introductory section. This is an acceptable practice.

Metric #19: Commentary

rev 5/1/17

Assessment levels: At the Min-AL for Metric 19, any State bridge-specific procedures need not be assessed during the field reviews of any bridges under Metric 12, which may include bridges requiring underwater inspections. If a specific issue related to Metric 19 is found for bridges field reviewed under Metric 12, it should add to the reviewer's knowledge and awareness toward Metric 19, and consider reviewing M19 at the Int-AL in the current or following review year, to further assess the extent of the issue. Discuss particular findings with the State and document them in the FSM.

Conversely, at the Int-AL for Metric 19, for bridges selected for both field and file review, any field findings should be applied directly to the compliance determination for Metric 19.

At the Int-AL, the process for determining the number and selection of sample bridges from this metric for inclusion in the field review for Metrics 12 and 22 is covered in Metric 12, and is repeated here in part. The Sampling Tool will automatically select a target number of bridges from this metric for the Metrics 12 and 22 field reviews if available in the selected geographic area (see selection criteria on the NBIP SharePoint site for field bridge selection). If fewer bridges than the target are available, the reviewer is not expected to go outside of the geographic area to review additional bridges.

For file reviews, evaluate the inspection procedures for compatibility with the inspection reports and the bridge plans.

The field reviews should verify the complex bridge designation, in addition to the other aspects of field review conducted under Metric 12 and 22.

For those bridges selected from this metric for field review, the reviewer should look for any evidence of risk factors or unique circumstances or conditions at each site. Then evaluate whether the inspection procedures and inspection reports adequately address them.

Background/ changes for PY 2018: *No substantial changes were made to this metric. Minor clarifications and editorial corrections were made.*

Metric #20: Inspection procedures – QC/QA

rev 5/1/17

NBIS Reference: 23 CFR 650.313 (g) – QC/QA

Criteria

- Systematic quality control (QC) and quality assurance (QA) procedures are used to maintain a high degree of accuracy and consistency in the inspection program.
- QC/QA procedures include periodic field review of inspection teams, periodic refresher training requirements, and independent review of inspection reports and computations.

Population: None (or as determined to be appropriate by the reviewer).

Compliance Levels

Compliance (C): All of the following must be met for C:

- QC/QA procedures are established, documented, implemented, and effective.
- QC/QA procedures include periodic field review of inspection teams, periodic refresher training requirements, and independent review of inspection reports and computations.

Substantial Compliance (SC): All of the following must be met for SC:

- QC/QA procedures are established, implemented, and effective, but minor aspects of the procedures are not documented or are not being performed.
- QC/QA procedures include periodic field review of inspection teams, periodic refresher training requirements, and independent review of inspection reports and computations.

Non-Compliance (NC): One or more SC criteria are not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Assess based on previous review results and the reviewer's knowledge and awareness of QC/QA procedures.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Review written procedures to verify that the key components of the QC/QA procedures meet the requirements of the NBIS.
- Verify that a process exists to document the bridges that have received QC or QA.
- Review documentation of QA reviews for number of reviews, types of reviews and findings; verify that any measurable review requirements have been achieved.
- Assess whether the procedures are effective in improving program accuracy and consistency, by determining if actions resulting from the QA findings are being taken.
- Perform interviews of personnel responsible for QC and/or QA reviews to determine or verify procedures are used.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines.

Metric #20: Commentary

rev 5/1/17

General: This metric evaluates if the QC/QA process meets the intent of the NBIS, verifies that the reviews are performed, and ensures that review results are used to maintain a high degree of accuracy and consistency in the inspection program.

FHWA's recommended QC/QA framework can be found at http://www.fhwa.dot.gov/bridge/nbis/nbisframework.cfm.

Criteria: *Computations* include but are not limited to load rating and scour evaluation calculations.

Review of Inspection Reports should also include review of the NBI data associated with the inspection.

Population: A population was not defined for this metric. There are many different methods and requirements by which Agencies perform QC/QA review of inspections, load ratings, NBI data, and other computations.

However, if the established QC/QA process lends itself to random sampling, the reviewer may use the NBIP assessment sampling criteria to review the various aspects of QC/QA process.

Compliance levels: *Implemented* QC/QA procedures infers that the procedures are enacted and used.

When evaluating this metric, consider if repetitive errors are found during the review of Metrics 12, 13, 18, and 22, as this may be an indication that the QC/QA procedures are ineffective.

If minor aspects of the QC/QA process are not being performed, but the overall effectiveness is not impacted, this would be considered SC. An example of *minor aspects* would be cases where a QC/QA check was performed, but documentation of the check is missing.

Assessment levels: The Min-AL is based upon the reviewer's knowledge and awareness the agencies QC/QA program and if the procedures are being followed.

Key components include periodic field review of inspection teams, periodic bridge inspection refresher training for program managers and team leaders, and independent review of inspection reports, NBI data, and computations.

At the Int-AL, review documented procedures for performing QC/QA of inspections, NBI data, and calculations to verify that the procedures include all NBIS required components.

Verify that established criterion exists for refresher training as part of this metric. Evaluate adherence to the established criteria by the program manager and team leaders as part of Metrics 2 and 3, respectively.

The QC/QA procedures should include a process to document and confirm that QC/QA procedures are being followed.

Verify that the information from the QC/QA process is used to maintain a high degree of accuracy and consistency in the inspection program. For example, if the review process finds a common coding error on several QA reviews, verify that the corrective action is disseminated (quarterly meetings, refresher training, memos, etc.) to all inspection teams.

Metric #20: Commentary

rev. 5/1/17

In addition to the QC/QA of owner's activities, verify that the procedures address the QC/QA of consultants and/or other agencies that perform inspections or calculations.

Interview personnel responsible for QC and/or QA to determine their level of understanding of the QC/QA process and if it is effective at maintaining a high degree of accuracy and consistency in the inspection program. At a minimum, one person should be interviewed, but this number can vary based upon the size of the program.

Background/ changes for PY 2018: *No substantial changes were made to this metric. Minor clarifications and editorial corrections were made.*

Metric #21: Inspection procedures – Critical Findings

rev 5/1/17

NBIS Reference: 23 CFR 650.313 (h) – Follow-up on critical findings

Criteria

- A procedure is established to assure that critical findings, as defined in 650.305, are addressed in a timely manner.
- FHWA is periodically notified of the actions taken to resolve or monitor critical findings.

Population: All bridges identified by State criteria as having an active critical finding at the time of the last assessment, and any critical findings identified since the last assessment.

Compliance Levels

Compliance (C): All of the following must be met for C:

- A documented procedure has been established and implemented to assure critical findings are addressed in a timely manner.
- All critical findings are addressed and documented in accordance with the procedure.
- The period for notifying the FHWA of actions taken is established and followed.

Substantial Compliance (SC): All of the following must be met for SC:

- A documented State procedure has been established and implemented to assure critical findings are addressed, but timeframes for addressing critical findings are not clearly defined.
- All critical findings are addressed in accordance with the procedure; isolated instances exist where documentation of actions taken is incomplete.
- The period for FHWA notification of actions taken is established; FHWA was notified of critical findings in all but a few isolated instances, and was notified within the established period in all but a few isolated instances.

Non-Compliance (NC): One or more SC criteria are not met.

Conditional Compliance (CC): Adhering to FHWA approved plan of corrective action (PCA).

Assessment Levels (AL)

Minimum Assessment (Min-AL): Perform all of the following:

- Monitor PCA if in effect.
- Monitor the periodic notifications to confirm that critical findings are being addressed.
- Verify the status of any critical findings during field reviews of bridges for Metrics 12 and 22.
- Assess based on previous review results and the reviewer's knowledge and awareness of the State's process for addressing critical findings.

Intermediate Assessment (Int-AL): In addition to the Min-AL:

- Verify that the established critical finding procedure meets the requirements of the NBIS.
- Randomly sample bridges and review the bridge files to ensure that actions taken and documentation were in accordance with the established procedure, and that proper notifications of critical findings were provided.
- Include some bridges from this metric's random sample in the Metric 12 and 22 field review sample, to verify that findings were addressed according to procedures.

In-Depth Assessment (InD-AL): Perform one of the following:

- Division InD-AL – In addition to the Int-AL, develop guidelines for review, with concurrence from BSE, and conduct in accordance with guidelines.
- National InD-AL – Conduct in accordance with national direction and guidelines.

Population: The bridges identified for the Metric 21 population are taken from the State's periodic reporting of critical findings to FHWA. This reporting includes critical findings that occurred on bridges owned by State, local, and other agencies.

Identify the reported bridges in the Sampling Tool to create a population for Metric 21 prior to developing the field review sites. Additionally, when the NBI data is loaded into the Tool, include in the Metric 21 population bridges with a condition rating for Items 59-60 or 62 that are less than or equal to 2 (Critical).

Active critical findings are those in which the owner has not taken or completed action to address public safety including closure, repair, or replacement of the bridge.

Compliance levels: *Timely* for this metric is established in the State's procedure for addressing critical findings.

Addressed means that the owner has taken actions to protect public safety including closure, repair or replacement of the bridge.

The critical finding procedure must identify the permissible timeframe from when a critical finding is identified to when the structural or safety concern is addressed. If the procedure does not identify timeframes for addressing critical findings, this should be considered SC.

At the Substantial Compliance level, there may be isolated instances where the critical finding has been properly addressed but the actions taken are not documented. This may include missing documentation for completed work or failure to close out the critical finding after work is completed.

The maximum suggested interval for periodic *FHWA notification* is 3 months.

In an isolated instance where a critical finding was not reported to the FHWA pursuant to the policy, this is considered SC.

Assessment levels: At both the Min and Int-AL, the Sampling Tool will automatically select a target number of bridges with CFs in the sample for Metrics 12 and 22 field reviews if they exist in the selected geographic area. See selection criteria on the NBIP SharePoint site for field bridge selection. If fewer than the target number are available, the reviewer is not expected to go outside of the geographic area to review additional bridges. At both assessment levels, verify the status of any additional bridges with CFs that may also have been selected in the field review sample.

Verify the status of the critical finding to identify whether the actions proposed for the critical finding have been completed such as closure, repair, or replacement of the bridge.

At the Min-AL, monitor the periodic notifications from the State to verify that critical findings are addressed. Verify throughout the year when the notification is received. If a critical finding is not being addressed in timely manner, work to address the critical finding and consider reviewing this metric at the Int-AL in the current or following review year, to further assess the extent of the issue.

At the Int-AL, review files to check that critical findings have adequate *documentation* to track the status of the actions proposed and whether they were completed. If a bridge in the random sample is included based only on having a condition rating ≤ 2, determine whether the bridge should have qualified under the State criteria as a critical finding. If so, notification should have been provided to FHWA and the reviewer should determine if this is an isolated occurrence or an indication of a more widespread issue.

Metric #21: Commentary

rev 5/1/17

When performing the review for this metric, consider how critical findings are monitored for bridges owned by local agencies.

If a critical finding for a bridge does not meet the intent of the NBIS regulation, it can be removed from the population.

Background for PY 2018: *This metric has been revised to include a check for critical findings that may have not been reported to FHWA, and also to perform field visits of critical finding bridges selected by the sampling tool.*