DEPARTMENT OF TRANSPORTATION

2021-2022 Biennial Report on the

Bridge Inspection Quality Assurance

February 2023

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Legislative Request

This report is issued to comply with Minnesota Statutes 165.03, subdivision 8.

165.03 STRENGTH OF BRIDGE INSPECTION.

Subdivision 8. Biennial report on bridge inspection quality assurance.

By February 1 of each odd-numbered year, the commissioner shall submit a report electronically to the members of the Minnesota Senate and House of Representatives committees with jurisdiction over transportation policy and finance concerning quality assurance for bridge inspections. At a minimum, the report must:

(1) summarize the bridge inspection quality assurance and quality control procedures used in Minnesota;

(2) identify any substantive changes to quality assurance and quality control procedures made in the previous two years;

(3) summarize and provide a briefing on findings from bridge inspection quality reviews performed in the previous two years;

(4) identify actions taken and planned in response to findings from bridge inspection quality reviews performed in the previous two years;

(5) summarize the results of any bridge inspection compliance review by the Federal Highway Administration; and

(6) identify actions in response to the Federal Highway Administration compliance review taken by the department in order to reach full compliance.

The cost of preparing this report is less than $5000.

Summary

The Minnesota Department of Transportation Bridge Inspection Program conforms to all state and federal laws and regulations. The National Bridge Inspection Standards are issued by the Federal Highway Administration and were last revised in December 2009. The NBIS is the most comprehensive bridge inspection document available and is the basis for the FHWA's annual evaluation of MnDOT's Bridge Inspection Program.

MnDOT maintains the Bridge and Structure Inspection Program Manual, the comprehensive reference manual that promotes consistent and uniform methods of inspection and documentation of bridge conditions throughout the state. The BSIPM was last updated in May of 2022 and is referenced frequently in this report.

MnDOT wrote an extensive quality control/quality assurance plan for its bridge inspection program in 2008, which is incorporated into the BSIPM as Chapter E. The plan is primarily a compilation of current practice assembled into a formal document with new processes added to comply with changes to the NBIS and more directly address quality assurance. The plan defines and delegates responsibilities for the statewide inspection programs to districts, counties, municipalities and other agencies. It also describes the certification and training program for qualified bridge inspectors and sets up a process for quality assurance reviews of state and local agency inspection programs.

The FHWA annually reviews MnDOT under its NBIS Oversight Program. This program is a standard method of assessing state DOT compliance within the federal requirements. This program splits the NBIS into 23 different focus areas, referred to as metrics. FHWA staff annually assess each metric, and if certain tolerances are exceeded, the state is required to provide a written plan on how it will make corrections to re-establish full compliance.

At the end of 2022, MnDOT was in full compliance with 22 of 23 NBIS metrics. The only NBIS metric with a written Plan of Corrective Action was Metric 13, Load Ratings. Load ratings are calculations made by engineers to define the safe carrying capacity and ascertain if a bridge needs to be posted for less than legal loads. The calculations need to be adjusted for structure design type, material, any deterioration of the structure and expected vehicle configuration. Minnesota needs to comply with a recent requirement to have all bridges within a mile of the interstate rated for emergency vehicles per the federal FAST Act legislation.

In 2012, the Moving Ahead for Progress in the 21st Century Act, or MAP-21, required National Tunnel Inspection Standards for proper inventory and assessment of tunnel assets. In 2015, MnDOT shifted five tunnels that were previously inspected under NBIS requirements to the NTIS. In 2019, MnDOT added one tunnel as part of a special agreement with the Metropolitan Airports Commission. Previously these were considered privately owned structures and the management and inspection were handled by MAC. However, after several meetings between MAC, FHWA and MnDOT it was decided to inventory and inspect this structure under the rules of the NTIS. All tunnels are on the state system or owned my MAC. All state-owned tunnels are inspected by MnDOT's Bridge Office and district-certified tunnel team leaders. All MAC tunnels are inspected by consultants using certified tunnel team leader inspectors. Chapter C of the BSIPM details the tunnel inspection requirements and program.

FHWA established an NTIS Oversight Program in 2019 and made its first metric assessments of MnDOT's Tunnel Inspection Program in 2020. As of the 2022 FHWA review, MnDOT was found fully compliant in 12 metrics and conditionally compliant in three of the 15 NTIS metrics:

- Metric 6 - Inspection Procedures (Quality Inspections)
    - MnDOT will identify which functional systems must be inspected in accordance with the TOMIE and the NTIS.
    - MnDOT will document inspection procedures for tunnel functional systems and train our inspectors to follow these procedures.
    - MnDOT will document inspection procedures for tunnel functional systems by July 1, 2023
- Metric 7 - Inspection Procedures (Tunnel-Specific Inspection Procedures)

The NTIS defines "tunnel-specific inspection procedures" as written documentation of the directions necessary to plan for and conduct an inspection. Directions include coverage of inspection methods, frequency of each method, inspection equipment, access equipment, identification of tunnel elements, components and functional systems, traffic coordination, and specialized qualifications for inspecting personnel.

- Owners will develop detailed inspection procedures for each NTIS tunnel by July 1, 2023.

- Metric 8 - Inspection Procedures (Functional Systems Testing)

The NTIS defines “functional systems” as non-structural systems, such as electrical, mechanical, fire suppression, ventilation, lighting, communications, monitoring, drainage, traffic signals, emergency response (including egress, refuge room spacing, or carbon monoxide detection), or traffic safety components.

- Owners will identify which functional systems require testing and develop testing procedures for those specific tunnel functional systems for each NTIS tunnel by July 1, 2023.
- Owners will develop detailed inspection procedures for each NTIS tunnel by July 1, 2023.

MnDOT has a current project with a consultant to prepare inspection procedures to meet the three remaining plans of corrective action within the next year.

Bridge Inspection Requirements

At the time of this report, MnDOT owned 4,812 bridges. Minn. Stat. 165.01, subd. 3 defines a bridge, "as a structure, including supports erected over a depression or an obstruction, such as water, a highway, or a railway, having a track or passageway for carrying traffic or other moving loads…." The language also defines a bridge as having an opening measured horizontally along the center of the roadway of 10 feet or more:

- between undercopings of abutments
- between the spring lines of arches, or
- between the extreme ends of openings for multiple boxes

The statutory definition for bridges also includes culverts with multiple pipes where the clear distance between openings is less than one-half of the smaller contiguous opening. This definition includes only those railroad and pedestrian bridges over a public highway or street.

The table below summarizes the required frequency of bridge inspections for MnDOT-owned bridges. Note that some MnDOT bridges are inspected by local agencies as defined by a partnership agreement. The assigned bridge inspection frequency varies based on different risk factors, such as design of structure and condition of the structure. New or rehabilitated bridges owned by MnDOT are initially assigned a 90-day inspection frequency as required by federal law.

Table 1: Required Frequency Inspections

Required Inspection Frequency [Months]	MnDOT-Owned Bridges to be Inspected Within Required Frequency
3	15
12	204
24	3,912
48	681

These are new bridges inspected on an initial 90-day frequency; once inspected at the 90-day mark, they will then be put on a 24-month inspection cycle.

In Minnesota, there are currently 70 Non-redundant Steel Tension Members bridges (formerly called fracture critical) bridges open to vehicular traffic. An NSTM bridge is defined by the FHWA as having at least one primary load-carrying steel member in tension, or with a tension element, whose failure would probably cause a portion of, or the entire bridge, to collapse. MnDOT inspects the majority of NSTM bridges in the state for the different owners of these bridges.

Table 2: NSTM Bridge Inspections Counts

NSTM Bridge Inspections	Count
MnDOT Inspected and Owned	**38***
MnDOT Inspected – County Owned	**8**
MnDOT Inspected – City Owned	**12**
MnDOT Inspected – Department of Natural Resources Owned	**5**
MnDOT Inspected – Township Owned	**4**
Consultant Inspected – Railroad Owned	**2**
Consultant Inspected – Department of Administration Owned	**1**

**Two bridges, Bong and Prescott, were inspected by WisDOT because shared ownership with MnDOT.*

MnDOT also administers contracts to perform underwater inspections for 281 MnDOT and 408 locally owned bridges. Underwater inspections involve an in-depth look at bridge components residing underwater and must be accessed with specialized scuba diving equipment. The state inspects these structures on a four-year cycle so the next inspection will occur in 2024.

In 2021, 16 critical findings for bridges were reported in Minnesota. In 2022, there were 21 critical findings (as of November 23, 2022). Critical findings are conditions that threaten public safety and, if not promptly corrected, could result in the collapse or partial collapse of a bridge. All critical findings were promptly documented, reported and resolved. Typical causes for critical findings include scour, deterioration, bridge hits from over-height vehicles and settlement. Table 3 below is a summary of the critical finding details for 2021 and 2022.

Table 3: Critical Finding Summary

Date	Bridge	Owner	Description
2/3/2021	14524	Clay County	Substantial Pier Movement - Permanent Closure
2/16/2021	62627	Ramsey County	Fire Damage to Prestressed Beams
4/22/2021	L4038	Houston County	Steel Beam Corrosion (Section Loss, e.g. holes rusted through) - Closed Indefinitely
5/26/2021	R0884	Dodge County	Steel Culvert Corrosion (Section Loss) - Monitor
6/15/2021	7615	Cook County	Pedestrian Bridge (Load Capacity Issues) - Signage Installed, Removed from Bridge Inventory
6/21/2021	50524	Mower County	Steel Piling Corrosion (Section Loss) - Repaired
7/1/2021	L2268	Rock County	Severe Deterioration - Closed and Removed from Bridge Inventory
7/6/2021	69825	MnDOT District 1	Girder Damaged by Excavator - Bridge Removed (Twin Ports Interchange Project)
7/16/2021	09816	MnDOT District 1	Steel Piling Corrosion (Section Loss) - Repaired
7/15/2021	02502	Anoka County	Impact Damage - Posted with Weight Restriction
9/28/2021	93674	Anoka County	Steel Culvert Failure - Replaced by R0914
9/29/2021	L9384	Hennepin County	Steel Culvert Distortion - Posted with Weight Restriction
9/27/2021	80508	Wadena County	Prestressed Voided Slab Failure - Posted with Weight Restriction
10/13/2021	L7120	Wadena County	Scour and Settlement - Bridge Closed to Vehicular Traffic, to be used as a Trail Bridge
10/25/2021	L8824	Dodge County	Steel Culvert Corrosion (Section Loss) - Posted with Weight Restriction
11/29/2021	L8680	Renville County	Timber Piling Decay - Bridge Closed
4/11/2022	35J42	Kittson County	Culvert Washout - Repaired
4/24/2022	93792	Clearwater County	Culvert Washout - Replaced by 15J29
4/24/2022	15J13	Clearwater County	Roadway Washout Along Culvert - Repaired
4/24/2022	L1496	Clearwater County	Culvert Washout - Permanently Closed
4/24/2022	L1669	Clearwater County	Roadway Washout Along Culvert - Repaired
7/27/2022	27C04	City of Minneapolis	Steel Column Supporting Skyway Bulged and Cracked - Repaired in Fall 2022

Date	Bridge	Owner	Description
8/12/2022	20504	Dodge County	Timber Piling Failure and Partial Collapse as Milling Machine Drove Over - to be Replaced
8/17/2022	27520	MnDOT Metro	High Load Damage to Pedestrian Bridge - Span Removed
8/10/2022	64503	Redwood County	Timber Slab Deflection, Fractured Stiffener Beam
8/25/2022	7102	Yellow Medicine County	Timber Piling Decay
9/1/2022	L9384*	Hennepin County	Steel Culvert Corrosion (Section Loss)
9/13/2022	93725	Martin County	Steel Culvert Distortion
9/14/2022	90683	Wright County	Steel Beam Section Loss and Cracking (Railroad Bridge)
9/21/2022	L7206	Martin County	Timber Piling Decay
10/6/2022	25501	Goodhue County	Steel Piling Corrosion (Section Loss)
10/6/2022	L1954	Redwood County	Steel Culvert Distortion
10/10/2022	L6850	Redwood County	Steel Culvert Distortion
10/27/2022	L8824*	Dodge County	Steel Culvert Corrosion (Section Loss)
10/31/2022	L0870	Ottertail County	Lateral bracing failure
11/3/2022	89511	Cottonwood County	Timber abutment cap crushing
11/22/2022	27237	Hennepin County	Deck underside deterioration

**These two bridges had critical findings both years, so they are listed twice.*

There are currently 107 MnDOT employees, 281 other agency employees from the Department of Natural Resources, cities, counties, private sector, etc. and consultants certified to perform bridge inspections. Certification requires either an engineering degree or five years of experience performing bridge inspections. Also required are two weeks of training in an FHWA-approved course and successfully passing the Minnesota-designed field proficiency exam. Once certified, inspectors attend a one-day bridge inspection refresher seminar twice in a four-year period to maintain their certification.

MnDOT's Bridge Office presented virtual inspection seminars in 2021 and 2022. In addition to these seminars, the Bridge Office coordinated the delivery of the National Highway Institute's comprehensive inspection classes in 2021 and 2022. These two-week classes are required in addition to the regular bridge certification courses to become certified as an inspection team leader.

In response to findings by the Legislative Auditor in 2008, MnDOT created new performance measures to document the timeliness of bridge inspections and follow-up maintenance actions. For the 2020 inspection season, 99.5 percent of all routine bridge inspections were completed on time. During the 2021 inspection season, 99.5 percent of all routine bridge inspections were performed on time. At the time of this report, inspection data is still being reported from inspectors, so it is not possible to report on-time inspections for 2022.

MnDOT's Bridge Office evaluated the bridge inspection programs of all Minnesota's inspection agencies in 2021 and 2022. The in-depth review included several random bridge site visits, a more thorough review of the program and a report with findings and improvement recommendations. In 2021, in-depth reviews were conducted for 33 agencies (site visits to 95 bridges). Two local agencies were determined to be out of compliance with the NBIS for failing to meet inspection quality standards. Both agencies have been working with

the new MnDOT Bridge State Aid Bridge Inspection Liaisons to improve their bridge inspection process. In 2022, in-depth reviews were conducted for 26 agencies (site visits to 98 bridges). The 2022 in-depth review process is still being conducted at the time of this report.

During these in-depth examinations, important findings from the local agency are reviewed with state and local bridge inspection staff who attended the annual bridge inspections seminars.

Additionally, each agency has access to MnDOT's website listing custom reports the agency can use to review the current status of its bridges. Even the agencies that did not have a full, formal program evaluation are asked to provide additional information and documentation concerning out-of-date bridge ratings, plans to monitor scour and late or incomplete inspections.

In 2019, MnDOT State Aid Office hired two new positions to help with local agency bridge inspections. They travel throughout the state training, answering questions, providing training on the use of specialized inspection equipment, and reviewing reports.

Bridge Inspection Quality Assurance & Quality Control Procedures

MnDOT's quality assurance and quality control procedures governing its statewide bridge inspection program are described comprehensively in Chapter E of the BSIPM.

Below is a summary of the major components of the program.

Quality Control Responsibilities

Within MnDOT, there is a bridge and tunnel inspection program manager. The specific responsibilities of MnDOT's bridge inspection program manager are described along with those responsibilities delegated to district and local agency program administrators and inspection team leaders.

Inspection Program Qualifications

MnDOT maintains a program to certify bridge inspectors as team leaders and approves the appointment of program administrators who meet the NBIS minimum experience and training requirements. Program administrators are required to be registered professional engineers. Inspection team leaders are required to be engineers, or have five years of bridge inspection experience, and have completed a FHWA approved two-week bridge inspector training course.

In addition, MnDOT certification requires inspection team leaders to pass a field proficiency test. All program administrators and team leaders are required to attend two days of refresher training every four years and must submit documentation that they have competently performed their duties and responsibilities. Failure to maintain qualifications can result in decertification or denial of appointment, making the person ineligible to perform bridge safety inspection activities.

At the time of this report, Minnesota's state and local bridge inspections are conducted by 214 different entities (MnDOT districts, counties, cities and other agencies). Within these agencies, there are 162 appointed program administrators and 388 certified bridge inspection team leaders. Many program administrators serve dual roles for different agencies. It is not uncommon for the county engineer to also represent a city, or for one consultant to serve as a program administrator for many cities. Nor is it uncommon for a team leader to serve multiple inspection agencies.

Inspection Quality and Frequencies

MnDOT sets minimum requirements on the frequency of bridge inspections based on criteria established by the MnDOT Bridge Office. Generally, the higher risk structures are inspected on a 12-month cycle and the lower risk structures on a 24-month or 48-month cycle. Higher risk structures are defined as having at least one component in 'Poor' condition or containing at least one non-redundant steel tension member. Lower risk structures are bridges that have all components in 'Fair' or better condition. According to the NBIS, all new structures owned by the state need to be inspected within 90 days of the structure opening to traffic; and, for all other owners, new structures need to be inspected within 180 days. Once the bridge receives the initial

inspection, it is set on a 24-month inspection cycle. If the structure meets the defined criteria, the new frequency is granted until the structure no longer meets the criteria, or the agency requests it to be changed.

Training

MnDOT offers several inspector trainings and seminars each year. Prior to certification as a team leader, inspectors must take the two-week course entitled, "Safety Inspections of In-Service Bridges." The course is taught by instructors from the National Highway Institute and is an FHWA-approved comprehensive bridge inspection training course. Other National Highway Institute courses on advanced topics are scheduled periodically.

Attendance for classes taught in 2021 and 2022 is shown below.

Table 4: 2021-2022 Attendance

Course	2021 Attendees (1 Session)	2022 Attendees (2 Sessions)
Safety Inspections of In-Service Bridges	14 MnDOT 3 Local 0 Federal 6 Consultants	0 MnDOT 56 Local 4 Federal 0 Consultants

In addition to these courses, MnDOT staff annually conducts refresher training seminars for program administrators and inspection team leaders. The seminars are held at various locations throughout the state. Topics typically include sharing best practices, a review of deficiencies found during inspection program quality reviews, FHWA compliance review findings, load rating issues and inspection manual updates. MnDOT conducted virtual (online) training seminars in 2021 and 2022. There were 482 attendees in 2021 and 542 attendees in 2022.

All tunnel inspection team leaders and the program manager must be recertified every five years. In 2020, MnDOT hosted a recertification training for the three team leaders and program manager in addition to other regional attendees.

Compliance and Quality Reviews

FHWA performs an annual review of each state agency's bridge and tunnel inspection program. The purpose of the review is to evaluate whether the state's policies, procedures and operating practices meet the requirements of the NBIS and NTIS. The focus of the review varies from year to year, but typically includes a random assessment of inspector qualifications, timeliness of bridge inspections, quality of notes for the correct elements, load ratings, inspection procedures and bridge scour documents.

Similarly, MnDOT reviews the bridge inspection programs of all 214 Minnesota agencies each year. A series of database queries is used to estimate the level of compliance with the NBIS for each of the agencies. In-depth review is usually recommended when there is a poor-performing agency or for an agency that has not been reviewed for five years.

The in-depth review involves a meeting with the bridge inspection program administrator and a field review with the bridge inspection team leader(s). Agencies selected for the in-depth review and the agencies reviewed solely by database queries are sent a report of their compliance for the year. MnDOT then annually follows up with each agency to ensure action. Additional information regarding this practice is detailed in Summary of Findings from Bridge Inspection Quality Assurance Reviews of this document.

Chapter C of the BSIPM is for tunnels, including a section to describe the process for compliance and quality reviews.

Changes to Quality Assurance & Quality Control Procedures

Most of the quality control and quality assurance processes used by MnDOT were not modified in the past two years. Substantive changes are described in this section.

Bridge Office Monitoring of Inspection Timelines

Since the federal requirement allows locally owned structures 180 days to update their inspection data in the state inventory, it limits MnDOT's ability to effectively monitor if inspection frequencies are being met. For example, if a bridge is due for inspection in May, the agency has until November to fill out an inspection report. Using an electronic records review, MnDOT has no idea if the inspection has been completed but not entered or not inspected at all.

MnDOT corrected this issue for Metric 6 by implementing two changes:

1. Created a new policy requiring Minnesota inspection agencies to start an electronic report in the Structure Information Management System within three months of the inspection due date.

2. Created software to monitor the inspection database and email agencies that fail to meet the 3 month requirement. This ensures that the bridge was inspected, and if not inspected, allows an agency to correct the issue before the deadline is beyond tolerances.

Inspection Equipment

The 2009 NBIS changes increased the frequency of inspections for bridges with non-redundant steel tension members. The increased frequency and number of inspections required the purchase of additional inspection equipment. Prior to 2007, MnDOT operated four under-bridge inspection vehicles. Since then, the agency purchased additional UBIVs to accommodate the more frequent inspection mandate. The NSTM bridge inspection fleet currently consists of the equipment listed in Table 5.

Table 5: Current Bridge Inspection Assets and Status

Vehicle	Reach	Purchased	Comments	Location
A-75	75 feet	2000	Complete factory rebuild in 2012.	Oakdale
UB-30	30 feet	2000	Complete factory rebuild in 2014.	Oakdale
A-62	62 feet	2008		Carlton
A-62	62 feet	2011		Rochester
A-62	62 feet	2012		Bemidji
Moog	15 feet	2009	Lighter weight platform for posted bridges.	Oakdale
A-62T	62 feet	2017	Specialized to access bridges with a wide sidewalk.	St. Cloud

In addition, the Bridge Office, most districts, some local agencies and several consultants have purchased drones to help inspection access. The drones have been successfully used since the 2021 inspection season for better quality and worker safety.

Summary of Findings from Bridge Inspection Quality Assurance Reviews

MnDOT's Bridge Office conducts National Bridge Inspection Standards quality assurance reviews each year of local agency inspection programs. A new process for evaluating agencies began in 2012. The review now aims to mirror the FHWA metric evaluation of Minnesota and apply the same appraisal to local agencies using the FHWA Metrics for the Oversight of the National Bridge Inspection Program manual. The review annually assesses a compliance level for all agencies statewide based on eight of the 23 metrics using a series of database queries. Listed below are the eight metrics assessed with this method.

#2: Qualifications of personnel – Program Administrator
#3: Qualifications of personnel – Team Leader(s)
#6: Routine inspection frequency – Lower risk bridges
#7: Routine inspection frequency – Higher risk bridges
#12: Inspection procedures – Quality Inspections
#13: Inspection procedures – Load Rating
#14: Inspection procedures – Post or Restrict
#23: Inventory – Timely Updating of Data

In-depth reviews are scheduled with agencies every year. Agencies are selected for an in-depth review based on poor performance with the eight metrics or because the agency has not had an in-depth review in the past five years. In-depth reviews incorporate the assessment of five additional metrics. These reviews require a field review and an office meeting with agency personnel. Listed below are the five additional metrics assessed during an in-depth review.

#15: Inspection procedures – Bridge Files
#17: Inspection procedures – Underwater
#18: Inspection procedures – Scour Critical Bridges
#21: Inspection procedures – Critical Findings
#22: Inventory – Prepare and Maintain

In 2021 and 2022, in-depth reviews were performed for the agencies and organizations listed in Table 6.

Table 6: 2021-2022 Locations of In-Depth Reviews

State Agencies	Counties	Cities	Other Bridge Owners
MnDOT District 6	Beltrami County	City of Albert Lea	Met Council (MTC-LRT)
MnDOT District 7	Blue Earth County	City of Baxter	University of Minnesota Transit
MnDOT District 8	Brown County	City of Blaine	
	Chippewa County	City of Bloomington	
	Chisago County	City of East Bethel	
	Fillmore County	City of Edina	
	Freeborn County	City of Faribault	
	Grant County	City of Ham Lake	
	Hennepin County	City of Hopkins	
	Le Sueur County	City of Inver Grove Heights	
	Lincoln County	City of La Crescent	
	Lyon County	City of Lake City	
	Meeker County	City of Maple Grove	
	Morrison County	City of Marshall	
	Murray County	City of New Hope	
	Nicollet County	City of Orono	
	Nobles County	City of Owatonna	
	Olmsted County	City of Plymouth	
	Pennington County	City of Ramsey	
	Pipestone County	City of St. Anthony	
	Pope County	City of St. Louis Park	
	Ramsey County	City of Winona	
	Renville County	City of Worthington	
	Rock County		
	Traverse County		
	Wabasha County		
	Watonwan County		
	Wilkin County		
	Winona County		
	Yellow Medicine County		

Actions Responding to Findings from Bridge Inspection Quality Assurance Reviews

Quality Assurance Review Findings and Follow-up

MnDOT's Bridge Office follows up on quality assurance review findings by sending a letter to each agency to notify it of areas where improvement is needed. Agencies falling out of compliance are subject to additional review and may need to provide a Plan of Corrective Action. MnDOT's State Aid Division may withhold funding from agencies that are repeatedly out of compliance with NBIS rules or with the AASHTO Manual for Bridge Evaluation. In addition to notifying agencies about their specific levels of compliance with the NBIS, the letters list the individual performance for each metric and the data that was used to compute the compliance level. This allows the agency to see which areas need improvement and offers an opportunity to check the data for accuracy. Agencies selected for the in-depth review were generally receptive to the findings about areas needing improvement and indicated they will take steps to correct deficiencies. Agencies that do not adequately improve by the next cycle may be selected again for another in-depth review and then may be required to provide a PCA to ensure improvement of the program.

Findings Discussed at Bridge Inspection Seminars

Since each agency receives an in-depth review roughly once every five years, it is important MnDOT develop other methods to more frequently communicate some of the more common problems found during agency reviews. MnDOT uses the annual bridge inspection seminars for that purpose. Agendas for the seminars are designed to address the common deficiencies found during agency reviews.

National Bridge and Tunnel Inspection Program Review

The 2021-2022 program assesses metrics, or focus areas, derived from the Code of Federal Regulations specific to the NBIS and NTIS. Each of the metrics is cyclically reviewed by the FHWA on an intermediate or in-depth level, and if the state is not operating to a defined level of expected performance, an agreement (either called an Improvement Plan or Plan of Corrective Action) between FHWA and MnDOT is put into place.

If the state then operates under the agreement, the state will be considered in conditional compliance until the terms of the agreement expire. For the NBIS, Minnesota is currently in full compliance with 22 of the 23 metrics and conditional compliance for one metric:

> **NBIS Metric 13** – Load Ratings
>
> On November 3, 2016, the Federal Highway Administration issued a memorandum on load ratings under the Fixing Americas Surface Transportation Act-Emergency Vehicles section. Minnesota has been working on implementing FHWA memorandum to all bridges (non-culverts) since 2017. However, the evaluation of the culverts on the Interstate system and within 1 road mile boundary of the Interstate system will not be completed in time, and an agreement is necessary to work out an extended timeline to meet the requirements of the FAST Act.

For the NTIS, Minnesota is currently in full compliance with 12 of the 15 metrics and in conditional compliance for three metrics:

NTIS Metric 6 – Inspection Procedures (Quality Inspections)

This determination was made because MnDOT did not have enough tunnel inspectors and did not have enough access equipment during some of the 2019 NTIS inspections.

NTIS Metric 7 – Inspection Procedures (Tunnel-Specific Inspection Procedures)

This determination was made because Minnesota has not yet developed tunnel-specific inspection procedures.

NTIS Metric 8 – Inspection Procedures (Functional Systems Testing)

This determination was made because Minnesota has not yet developed procedures for the testing of specific tunnel functional systems.

Response to FHWA Compliance Review Findings

The following is a summary of MnDOT responses corresponding to each of the compliance reviews listed in the previous section, which were created after the FHWA reviews. MnDOT has formulated written plans to address the deficiencies in its inspection program as highlighted by these metric assessments.

Annual National Bridge Inspection Standards Compliance Review

No follow-up action was needed by MnDOT for any of the 35 metrics (22 on NBIS, 13 on NTIS) that are currently in full compliance. MnDOT developed agreements with the FHWA to address the issues with the four (1 NBIS, 3 NTIS) conditionally compliant metrics:

NBIS Metric 13: Load Rating – estimated completion date December 2024

Action Item 1: MnDOT will load rate the culverts on the Interstate (or within a reasonable access distance of the Interstate) for EV2/EV3 emergency vehicles.

Action Item 2: MnDOT will develop the emergency vehicles posting procedure for the culverts. Bridge owners will implement the load posting procedure and complete the installation of the posting signs for the required culverts.

Action Item 3: MnDOT will update FHWA with progress on this initiative monthly. The monthly report will include the number of culverts to be rated, number of culverts completed to date and load rating results.

NTIS Metric 6: Quality Inspections – estimated completion date July 2023

- **Action Item 1**: MnDOT will identify which functional systems must be inspected in accordance with the Tunnel Operations, Maintenance, Inspection, and Evaluation Manual and the NTIS.
-
- **Action Item 2**: MnDOT will document inspection procedures for tunnel functional systems and train our inspectors to follow these procedures.
-
- **Action Item 3**: MnDOT will document inspection procedures for tunnel functional systems by July 1, 2023.
-

NTIS Metric 7: Tunnel-Specific Inspection Procedures – estimated completion date July 2023

- **Action Item 1**: Owners will develop detailed inspection procedures for each NTIS tunnel by July 1, 2023.
-

NTIS Metric 8: Functional Systems Testing – estimated completion date July 2023

Action Item 1: Owners will identify which functional systems require testing and develop testing procedures for those specific tunnel functional systems for each NTIS tunnel by July 1, 2023.

Action Item 2: Owners will develop detailed inspection procedures for each NTIS tunnel by July 1, 2023.

Appendix A: List of Acronyms

- **AASHTO:** American Association of State Highway and Transportation Officials
- **BII:** Bridge Inventory Inspection database used for reporting and compliance assessments
- **BSIPM:** Bridge and Structure Inspection Program Manual
- **FHWA:** Federal Highway Administration
- **MnDOT:** Minnesota Department of Transportation
- **NBIS:** National Bridge Inspection Standards
- **NSTM:** Non-redundant steel tension member. Bridges with these types of components require additional inspection procedures; also called fracture critical.
- **NTIS:** National Tunnel Inspection Standards
- **PCA:** Plan of Corrective Action
- **QA:** Quality assurance
- **QC:** Quality control
- **UBIV:** Under Bridge Inspection Vehicle
- **UW:** Underwater. This is a type of special bridge inspection that requires dive equipment for bridges in deep water.