



February 1, 2019

The Honorable Frank Hornstein, Chair
House Transportation Finance & Policy Committee
545 State Office Building
Saint Paul, MN 55155

The Honorable Scott Newman, Chair
Senate Transportation Finance & Policy Committee
3105 Minnesota Senate Building
Saint Paul, MN 55155

The Honorable Paul Torkelson, GOP Lead
House Transportation Finance & Policy Committee
251 State Office Building
Saint Paul, MN 55155

The Honorable Scott Dibble
Ranking Minority Member
Senate Transportation Finance & Policy Committee
2213 Minnesota Senate Building
Saint Paul, MN 55155

RE: 2017-2018 Biennial Report on Bridge Inspection Quality Assurance

Dear Legislators:

I am pleased to provide the report on Bridge Inspection Quality Assurance. This report is required under [Minnesota Statute 165.03, Subdivision 8](#).

The report highlights three components of bridge inspection and quality assurance, which include the following:

- Bridge inspection quality assurance and quality control procedures and recent changes to any of those procedures
- Findings from the bridge inspection quality reviews during the past two years and any actions taken as a result of the reviews
- Results of Federal Highway Administration bridge compliance reviews and any actions taken in response to those review findings.

Improving quality is a continuous process in MnDOT's quest to create and maintain a safe, efficient and sustainable transportation system. In partnership with the Federal Highway Administration and county and municipal agencies, MnDOT seeks to provide the best available technology and training to bridge inspections staff throughout the state. Collectively, these practices help ensure the safety of Minnesota's transportation system.

Please contact me if you have questions about this report, or you may contact Ed Lutgen in the Bridge Office at edward.lutgen@state.mn.us or at 651 366-4507.

Sincerely,

A handwritten signature in cursive script that reads 'Margaret Anderson Kelliher'.

Margaret Anderson Kelliher
Commissioner

2017-2018 Biennial Report on the

Bridge Inspection Quality Assurance

February 2019



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You may also send an email to ADArequest.dot@state.mn.us

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Legislative Request

This report is issued to comply with [Minnesota Statutes 165.03](#).

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 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 \$5,000.

Summary

The Minnesota Department of Transportation Bridge Inspection Program strives to conform 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 went through a major effort in 2016 to update the Bridge and Structure Inspection Program Manual. The [BSIPM](#), posted on MnDOT's website, is the comprehensive reference that promotes consistent and uniform methods of inspection and documentation of bridge conditions throughout the state.

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.

To gather baseline data about bridge condition, a significant change was implemented starting with the 2017 inspection program requiring all new bridges be inspected by certified safety inspectors within 90 days of the open-to-traffic date for MnDOT bridges and within 180 days for local bridges. The FHWA required this change to the inspection program. Previous state practice was for construction staff to perform an inspection and then within the next year a bridge would have its first certified safety inspector inspection. This new protocol change for an initial inspection helps establish a baseline condition for deterioration curve modelling.

The passage in 2012 of federal legislation, Moving Ahead for Progress in the 21st Century Act, or MAP-21, requires the Secretary of Transportation to establish national standards for tunnel inspection. FHWA established the National Tunnel Inspection Standards for proper inventory and assessment of tunnel assets. MnDOT officially submitted the preliminary tunnel inventory to FHWA in 2015. Based on a MnDOT assessment of structures and assets according to the federal standards, there are five tunnels in Minnesota that meet the requirements laid out in the law. Previously, MnDOT inspected those five tunnels as part of the national bridge inspection standards; now these tunnels are inspected under national tunnel standards.

MnDOT successfully inspected the five tunnels under the new NTIS specifications in 2017. The data set from these inspections was the first submitted to the national tunnel inventory database, was ahead of the deadline and had no errors. By the end of 2018, there were four certified tunnel inspectors at MnDOT.

MnDOT expects FHWA will conduct a quality assurance review of Minnesota's NTIS compliance. For any issues found in the review, MnDOT will be expected to respond and adjust policy to address the issues found by that review, very similar to how the NBIS Quality Assurance reviews are administered.

In the 2017 version of BSIPM, MnDOT made improvements to the critical deficiency procedure. Improved software reporting helps the program administrator through the process.

At the time of this report, MnDOT owned 4,835 bridges. "Bridge" is defined 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. Bridge is also defined as having an opening measured horizontally along the center of the roadway of 10 feet or more:

- between under copings of abutments
- along a culver opening
- between the spring lines of arches, or
- between the extreme ends of openings for multiple boxes.

Bridge also includes multiple pipes where the clear distance between openings is less than one-half of the smaller contiguous opening and along with all the tunnels. 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 bridges owned by MnDOT are initially assigned a three-month 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	6*
12	208
24	3,949
48	672

**The six bridges inspected on a 3-month frequency are all new bridges and once inspected at 3 months then will be put on a 24-month inspection cycle.*

In Minnesota, there are currently 85 fracture critical bridges open to vehicular traffic. A fracture critical 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 fracture critical bridges in the state for the different owners of these bridges.

Table 2: Fracture Critical Bridge Inspections Counts

Fracture Critical Bridge Inspections	Count
MnDOT Inspected and Owned	49
MnDOT Inspected – County Owned	12
MnDOT Inspected – City Owned	11
MnDOT Inspected – Township Owned	7
MnDOT Inspected – Department of Natural Resources Owned	4
Consultant Inspected – Railroad Owned	2

MnDOT also administers contracts to perform underwater inspections for 191 MnDOT and 367 locally owned bridges. Underwater inspections involve an in-depth look at bridge components residing underwater and that have to be accessed with specialized scuba diving equipment. The state inspects these structures on a four-year cycle with the last inspections occurring in 2016, so the next inspection will occur in 2020.

In 2017, 16 critical bridge deficiencies were reported in Minnesota. In 2018, there were 18 (as of Jan. 23, 2019). Critical deficiencies are conditions that threaten public safety and, if not promptly corrected, could result in the

collapse or partial collapse of a bridge. All critical deficiencies were promptly resolved. Table 3 below is a summary of the critical finding details for 2017 and 2018.

Table 3: Critical Finding Summary

Date	Bridge	Owner	Description
4/12/2017	R0721	County	Roadway washout along culvert steel CMP.
4/24/2017	9213	MnDOT	Impact damage to south fascia beam.
6/1/2017	2110	County	Scour exposing pier footing.
6/22/2017	L0023	County	Abutment movement.
7/24/2017	89823	County	Crushed timber pier cap.
7/28/2017	6347	MnDOT	Hole in deck.
8/28/2017	R0773	City	Impact damage to lower chord of a pedestrian bridge.
8/31/2017	6882	Railroad	Impact damage superstructure.
10/11/2017	9806	MnDOT	Impact damage superstructure.
10/12/2017	L5809	County	Decay timber cap south abutment.
10/19/2017	13806	MnDOT	Impact damage superstructure.
11/2/2017	58814	MnDOT	Impact damage superstructure.
11/30/2017	97196	County	Culvert barrel distortion and section loss.
12/1/2017	88513	County	Culvert barrel distortion and section loss.
12/4/2017	16509	County	Timber slab sag.
12/8/2017	92665	County	Advanced corrosion to culvert barrels.
1/9/2018	92647	County	Timber pile deterioration.
1/29/2018	2015	County	Deterioration of concrete deck slab at strip seal.
2/6/2018	90605	County	Corrosion of bottom of steel culvert causing distortion.
4/23/2018	91597	County	Scour between culvert barrels causing roadway erosion and failure.
5/3/2018	4531	Township	Timber pile deterioration.
5/31/2018	55514	City	Reinforced concrete pier cap cracking.
7/16/2018	58505	County	Timber pile failure.
7/18/2018	88949	County	Washout of culvert.
7/18/2018	64525	County	Washouts at both abutments causing south approach void.
7/18/2018	L6936	Township	Erosion causing roadway washout.
9/5/2018	62508	County	Impact damage.
9/19/2018	7097	County	Failure of the swivel hinge pin connection.
9/27/2018	R0089	County	Bearing cap crushed.
10/22/2018	L8683	County	Deflection of a steel culvert.
10/22/2018	L9379	County	Deflection of a steel culvert.
10/29/2018	46537	County	Void in roadway due to slope erosion at the abutment.
11/2/2018	L9685	Township	Deflection of a steel culvert.
11/2/2018	92188	County	Deflection of a steel culvert.

There are currently 105 MnDOT employees and 256 local agency employees 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 inspection seminars at seven locations statewide in 2017 and eight locations in 2018. In addition to these seminars, the Bridge Office coordinated the delivery of comprehensive inspection classes in 2017 and 2018. 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 2016 inspection season, 99 percent of all routine bridge inspections were completed on time. During the 2017 inspection season, in collaboration with FHWA, MnDOT's Metro District started an effort to move inspection cycles into months that would maximize the efficiencies of work crews. The rest of the state completed 98 percent of all routine bridge inspections 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 2018.

High-priority reactive bridge maintenance items are a best-practice scheduled event for completion within one year of identification and can include any deficiency that may affect the safe functioning of a bridge or cause it to deteriorate to a critical condition. In 2017 and 2018, 100 percent of high-priority reactive maintenance items were completed on time.

MnDOT's Bridge Office evaluated the bridge inspection programs of all Minnesota's local agencies in 2017 and 2018. Thirty-nine percent of agencies received an in-depth review. The in-depth review includes several random bridge site visits, a more thorough review of the program and a report with findings and improvement recommendations. In 2017, one local agency was determined to be out of compliance with the NBIS for lapsing on requirements for continuing education. This local agency put an agreement in place to ensure future training requirements are held to ensure future compliance. In 2018, a consultant was determined to be out of compliance for poorly documenting inspection results. The consultant removed the responsible individual from the administrator role and agreed to re-inspect all the bridges in 2018 with a higher degree of inspection quality.

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.

FHWA annually assesses the management of the statewide bridge inspection program through a set of 23 metrics. In 2017, Minnesota bridge owners were found in full compliance for 17 metrics and in conditional compliance for six metrics. In 2018, Minnesota bridge owners were found in full compliance for 19 metrics and in conditional compliance for four metrics. MnDOT addressed the four conditional compliance metrics through training, consultant contracts, revising policies and additional auditing of local bridge inspection documents and practices. Additional information regarding these changes is detailed in the body of the report.

Bridge Inspection Quality Assurance & Quality Control Procedures

MnDOT's quality assurance and quality control procedures governing its statewide 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 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 or program administrative activities.

At the time of this report, Minnesota's state and local bridge inspections are conducted by 205 different entities (MnDOT districts, counties, cities and other agencies). Within these agencies, there are 142 appointed program administrators and 361 certified bridge inspection team leaders. Of the 361 inspection team leaders, 105 are MnDOT employees. 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.

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- or 48-month cycle. Higher risk structures are defined as having at least one component in 'Poor' condition, or containing a fracture critical element. 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 180 days for all other owners. Once the bridge receives the initial inspection, the bridge 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 training classes and seminars each year. An introductory, one-week class, “Engineering Concepts for Bridge Inspectors,” is required for new inspectors who do not meet the experience or education requirements for team leader. 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. Due to demand, in 2017 the course was hosted twice, a first for Minnesota: once by MnDOT and the second by Lake County.

Attendance for classes taught in 2017 and 2018 is shown below.

Table 4: 2017 and 2018 Attendance

Course	2017 Attendees	2018 Attendees
Safety Inspections of In-Service Bridges	18 MnDOT 30 Local 0 Federal 12 Consultants	15 MnDOT 8 Local 1 Federal 6 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 15 training seminars around the state in 2017 and 2018. There were 372 attendees in 2017 and 420 attendees in 2018.

Compliance and Quality Reviews

FHWA performs an annual review of the agency’s bridge 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. 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 and fracture critical and bridge scour documents.

Similarly, MnDOT reviews the bridge inspection programs of all 205 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 section 3 of this document.

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 recent changes are described in this section.

Bridge Inspection Element Definition Change

Modifications and requirements to the law that were first implemented in the Moving Ahead for Progress in the 21st Century Act, or MAP-21, continue in the Fixing America's Surface Transportation Act, or FAST Act. The law requires each state and appropriate federal agency to report bridge element-level data to the U.S. Secretary of Transportation. Element-level inspections are a more detailed look at bridge features as opposed to providing a broad summary called component inspection. Minnesota has operated under element-level inspections since the early 90s, but in December 2013 the American Association of State Highway and Transportation Officials released the 2013 Manual for Bridge Element Inspection. The manual replaced the existing 1994 Commonly Recognized Elements that MnDOT was operating under.

The 2013 AASHTO manual created a major change to the old inspection methodology. MnDOT adopted these requirements in March 2016 by undergoing the following:

- A complete revision to the MnDOT Bridge Inspection Field Manual
- An upgrade of the Structure Information Management System, SIMS
- Migrating the existing data to the new format
- Reformulation of the data dependencies housed within MnDOT

MnDOT retrained the bridge inspection team leaders and bridge inspection program administrators on the revised bridge inspection procedures and reporting requirements. This was accomplished by offering 10 bridge inspection refresher seminars instead of the normal seven.

Overall implementation has been a success. Many inspectors adopted the new policies and procedures without the need for additional assistance. The data migration was not a flawless translation and this was emphasized during the inspection seminars. It was stressed that the rough edges of the data conversion needs to be smoothed out by the inspectors. Future MnDOT compliance reviews will take a close look at the resulting data and ensure that this expectation was met. The largest hurdle with the implementation was the upgrade of the SIMS software; major efforts were made to de-customize the solution and align with the commercial off-the-shelf version of the product.

Inspection Equipment

The 2009 NBIS changes increased the frequency of fracture critical bridge inspections. 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, additional UBIVs were purchased to accommodate the more frequent inspection mandate. The fracture critical 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
UB75	75 feet	2000	Complete factory rebuild in 2012.	Oakdale
UB30	30 feet	2000	Complete factory rebuild in 2014.	Oakdale
UB62	62 feet	2008		Carlton
UB62	62 feet	2011		Rochester
UB62	62 feet	2012		Bemidji
Moog	15 feet	2009	Lighter weight platform for posted bridges.	Oakdale
UB62	62 feet	2017	Specialized to access bridges with a wide sidewalk.	St. Cloud

Summary of Findings from Bridge Inspection Quality Assurance Reviews

MnDOT's Bridge Office Data Management Unit each year conducts National Bridge Inspection Standards quality assurance reviews 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 2017 and 2018, in-depth reviews were performed for the agencies and organizations listed in Table 6.

Table 6: 2017-2018 Locations of In-Depth Reviews

State Agency	County		City	Other Bridge Owners
MnDOT District 2	Anoka	Nobles	Alexandria	Canadian National Railroad
MnDOT District 4	Becker	Norman	Andover	IBM
MnDOT District 7	Benton	Otter Tail	Baxter	
MnDOT District 8	Big Stone	Polk	Bemidji	
DNR	Blue Earth	Red Lake	Burnsville	
	Chippewa	Redwood	Delano	
	Chippewa	Roseau	East Grand Forks	
	Clay	St. Louis	Eden Prairie	
	Clearwater	Stearns	Fairmont	
	Cook	Stevens	Farmington	
	Cottonwood	Todd	Golden Valley	
	Douglas	Waseca	Ham Lake	
	Faribault	Watonwan	Hugo	
	Goodhue	Wright	Hutchinson	
	Grant	Yellow Medicine	Litchfield	
	Hubbard		Mankato	
	Jackson		Minneapolis	
	Kittson		Moorhead	
	Koochiching		Morris	
	Lac Qui Parle		New Ulm	
	Lake		Paynesville	
	Lake Of The Woods		Red Wing	
	LeSueur		Sartell	
	Marshall		Sauk Rapids	
	Martin		St. Cloud	
	Meeker		Waite Park	
	Murray		Willmar	
	Nicollet		Worthington	

Actions Responding to Findings from Bridge Inspection Quality Assurance Reviews

Quality Assurance Review Findings and Follow-up

MnDOT's Bridge Inventory Management Unit 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 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 do so. Agencies that do not improve enough 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.

Reports Available Electronically to All Agencies

In 2011, MnDOT started using new software (called the Structure Information Management System) to track and manage inspection data. SIMS offers substantial improvements compared to the previously used program. Inspectors can now upload photos, bridge documents and inspection data to a web-based program that can be accessed anywhere with an internet connection. MnDOT pulls this data into an AASHTO-developed bridge management system called BrM (acronym for Bridge Management). Data from BrM is used to generate the compliance scores and identify deficiencies in an agency's inspection program or data. BrM also allows MnDOT to offer several standard reports that access recent data to help agencies better understand the overall condition of their bridge inventory and identify bridges needing inspection, missing data or that may need new load ratings. These and other reports are continuously available to agencies that log on to the [Bridge Reports Page](#) located on [MnDOT's Bridges and Structures](#) website. A few of the reports used during local reviews include:

- Bridge inspections due – Lists inspections that are due and overdue.
- Bridge inspection frequency – Lists the bridges on a 12-month, 24-month or 48-month inspection frequency and those eligible to be changed.
- Bridge compliance report – Gives a list of NBIS compliance issues for every bridge according to current interpretation of the FHWA metric assessment.
- Bridge inspection forecast report – Assumes that all bridges remain on the same frequency and are inspected on time, and then predicts what the bridge inspection workload will look like for a given agency.
- Bridge scour F, G, J – Lists bridges that have not been evaluated for scour, have unknown foundations or require further evaluation.
- Bridge scour plan of action – Lists whether bridges that are susceptible to scour have written plans of action guiding agency response during flood events.
- Bridge rating and posting – Lists bridges with capacity ratings, posting signs and those that are missing rating sheets or are in poor or serious conditions, which may require a new rating.
- FC, UW, PA – Lists bridges that are coded to require fracture critical, underwater or special pinned assembly type inspections.

Summary of Findings from FHWA Bridge Inspection Compliance Reviews

The FHWA is responsible for evaluating the overall quality and conformance to the NBIS of each state's bridge inspection program. MnDOT is evaluated on the management and inspection of its trunk highway bridges and its management and oversight of local agency bridge owners. Typically, the FHWA meets with the Minnesota State Bridge Engineer and staff to discuss findings, provide additional information and access inspection files as requested. Following the review, the FHWA Division Bridge Engineer submits a letter to the commissioner of transportation stating whether MnDOT was found in compliance with the NBIS and lists findings in the form of recommendations to improve the program based on its review. In 2011, the review process changed significantly. In the past, a state's program was given one overall determination of compliance. The new program is a data-driven and risk-based system that establishes 23 metrics for review and evaluation. The program strives to clearly define terms and processes and to better establish national consistency in program reviews between states.

National Bridge Inspection Program Review

The 2017-2018 program reviews and assesses 23 metrics, or focus areas, derived from the NBIS. 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.

As long as the state then operates under the agreement, the state will be considered in conditional compliance until the terms of the agreement expire. MnDOT is currently in full compliance with 19 of the 23 metrics and conditional compliance for four metrics, listed below.

The reasons for not meeting full compliance are listed below and a summary of MnDOT's action items to address the issues.

- **Metric 6 – Lower Risk Inspection Frequency.**

In the 2017 inspection season, 31 out of 5,785 bridges were not inspected by their frequency deadline by more than four months. The reasons for delay include scheduling issues, weather delays and resource constraints. This was a shared issue between MnDOT and local agencies.

- **Metric 12 – Inspection Quality.**

In 2017, three of the 26 field reviewed bridges did not meet FHWA Metric 12 assessment standards. The deficiencies include:

- Missing a shear crack in a concrete pier cap.
- Failing to assign an NBI condition code to a component.
- Improper monitoring of a substructure for scour.

- **Metric 13 – Load Ratings.**

On Nov. 15, 2013, FHWA issued a memorandum clarifying its position on the analysis of Specialized Hauling Vehicles as defined in the AASHTO Manual for Bridge Evaluation. The FHWA memo required all "bridges with the shortest span not greater than 200 feet (Group 1) should be re-load rated for SHV no later than December 31, 2017". Since 2010, 4,436 local bridges are re-rated, leaving 30 local bridges in the "Group 1" priority incomplete and yet to be re-rated.

- **Metric 23 – Updating of Data.**

In 2015, Minnesota was 96 percent compliant with updating the inventory within 90 days for a state-owned bridge, and 180 days for other-owned bridges. FHWA requires 100 percent compliance. This problem was found in MnDOT and local agencies

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.

Annual National Bridge Inspection Standards Compliance Review

No follow-up action was needed by MnDOT for any of the 19 metrics that are currently in full compliance. MnDOT developed agreements with the FHWA to address the issues with the four conditionally compliant metrics. These agreements and actions are actively being pursued and include the following:

Metric 6: Inspection Frequency – estimated completion date April 2020

Action Item 1: Create a new state policy. The policy will require all agencies to start inspection reports in SIMS within three months of the inspection deadline. The new policy will be effective beginning with the 2019 inspection season.

Action Item 2: Design and implement a system to monitor agency compliance with the new policy in Action Item 1.

- An agency that fails to meet the new three month requirement will receive an automatic email notification of non-compliance to Metric 23 – Updating of Data. This email will inform the agency that the inspection report must be started within SIMS in the next two weeks.
- If after two weeks an agency still has not met the reporting requirement, the agency is called and told of the possible consequences should the inspection not be completed and the SIMS report not be started by the end of the month.

Metric 12: Inspection Quality – estimated completion date April 2020

Action Item 1: Continue to identify high risk agencies for in-depth field review via computer assessment of current inspection reports. Agencies that poorly perform to the existing metric evaluation are then more likely to get scheduled for an in-depth review by MnDOT.

Action Item 2: Increase effort to evaluate agencies on Metric 12 during the MnDOT QC/QA reviews. This will be accomplished via line item assessment of each NBI appraisal rating and element-level condition states.

Action Item 3: Train agencies to the requirements of Metric 12 at the annual bridge inspection refresher trainings. Seminar presentations will demonstrate the proper methods to document inspection findings and what program administrators should look for in their reviews of the submitted team leader reports

Metric 13: Load Rating – estimated completion date January 2020

Action Item 1: MnDOT will load rate (or screen) remaining “Group 1” locally owned structures by Dec. 31, 2019.

Action Item 2: MnDOT will update FHWA with progress on this initiative quarterly.

Metric 23: Timely Updating of Data – estimated date of completion April 2019

Action Item 1: Annual report by Bridge Office. MnDOT’s Bridge Office to include a Metric 23 section in the annual compliance report to agencies with regards to their performance in updating inspection reports within the required timeframe.

Action Item 2: Annual review by Bridge Office. MnDOT’s Bridge Office will follow-up with delinquent agencies regarding poor performance with this metric during the in-depth quality assurance reviews. Agencies that fail to meet compliance requirements two years in a row will have to implement a plan of corrective action.

Action Item 3: Education for program administrators and team leaders. MnDOT’s Bridge Office will educate program administrators and team leaders at inspection refresher seminars about the importance of submitting, reviewing and approving bridge inspection reports within the required timeframe.

Appendix A: List of Acronyms

AASHTO: American Association of State Highway and Transportation Officials

BSIPM: Bridge and Structure Inspection Program Manual

FC: Fracture Critical-type of special bridge inspection for non-load path redundant structures

FHWA: Federal Highway Administration

MnDOT: Minnesota Department of Transportation

NBIS: National Bridge Inspection Standards

PA: Pinned Assembly-type of bridge design detail that requires a specialized equipment/inspection

PCA: Plan of Corrective Action

BrM: AASHTO-developed bridge management system; SIMS feeds data to BrM

SHV: Specialized Hauling Vehicle

SIMS: Structure Information Management System

UBIV: Under Bridge Inspection Vehicle

UW: Underwater-type of special bridge inspection