

# MICHIGAN STRUCTURE INSPECTION MANUAL

## BRIDGE INSPECTION

### CHAPTER 1

#### PROGRAM REQUIREMENTS

##### 1.01 Purpose

The National Bridge Inspection Standards (NBIS) require each state transportation department to inspect, or cause to be inspected, all structures defined as highway bridges located on all public roads, on and off Federal-aid highways, including tribally-owned and federally-owned bridges, private bridges that are connected to a public road on both ends of the bridge, temporary bridges, and bridges under construction with portions open to traffic. Michigan has a decentralized bridge inspection program that delegates inspection responsibilities to the regions, local agencies, and private bridge owners throughout the state. This chapter describes the State of Michigan's Bridge Inspection Program and clarifies the responsibilities and roles of those who are involved with maintaining NBIS compliance.

##### 1.02 Laws and Regulations

The Federal Highway Bridge Inspection Program regulations were developed as a result of the Federal Aid Highway Act of 1968 that required the Secretary of Transportation to establish the NBIS to ensure the safety of the traveling public. The NBIS required all public bridges on the Federal-aid highway system to have a Structure Inventory and Appraisal (SIA) conducted by 1972 and data reported to the Federal Highway Administration (FHWA). In 1978 the NBIS was extended to include all public bridges whether or not they were located on the Federal-aid highway system. As a result of the 1983 Mianus River Bridge failure the NBIS focused attention on fracture critical bridges by establishing national inspection guidelines for steel designs without load path redundancy, additional inspector training, and new fatigue research for these types of structures. After the collapse of the Schoharie Creek Bridge in 1987 the NBIS was modified based upon suggestions made in the 1987 Surface Transportation and Uniform Relocation Assistance Act. The national underwater inspection frequency interval was set at a maximum of 60 months and scour critical bridge inspections were initiated. In 2022 the NBIS was revised to address several requirements of the Moving Ahead for Progress in the 21st Century Act (MAP-21).

In addition to federal requirements, additional laws in reference to the safety inspection of bridges and culverts can be found in the Michigan Compiled Laws and are summarized as follows:

##### **Act 354 of 1925**

**254.19a Biennial inspection of bridges; plan** - The state transportation department shall institute a systematic plan of biennial inspection of all bridges under its jurisdiction.

**254.20 Posting of narrow and one-lane bridges; uniform traffic control devices** - Every bridge which has a clear 2-way roadway width of less than 19 feet, but more than 17 feet at the narrowest part thereof, shall be posted as a narrow bridge; and every bridge which has a clear 2-

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way roadway width, as so measured, of 17 feet or less, shall be posted as a 1-lane bridge. Such posting shall be in accordance with the manual of uniform traffic control devices adopted pursuant to section 608 of Act No. 300 of the Public Acts of 1949, being section 257.608 of the Compiled Laws of 1948.

**254.30 Bridge and culvert; synonymous** - the words “bridge” and “culvert” as used in this act shall be considered as synonymous terms.

### **Act 300 of 1949**

**257.631 Public bridge, causeway, or viaduct; maximum speed, load, or gross weight; violation as civil infraction; assessment of civil fine; exceptions; determination of civil fine; determination of gross weight; investigation; signs; evidence** – (5) The department of transportation, county road commission, or other authority having jurisdiction of a public bridge, causeway, or viaduct may conduct an investigation of that bridge, causeway, or viaduct. If it is found after investigation that the structure cannot with safety to itself withstand vehicles traveling at the speed or carrying a load otherwise permissible under this chapter, the department, commission, or other authority shall determine and declare the maximum speed of vehicles or load which the structure can withstand, and shall cause or permit suitable signs stating that maximum speed and load limitations to be erected and maintained not more than 50 feet from each end of the structure, and also at a suitable distance from each end of the bridge to enable vehicles to take a different route.

### **1.03 Federal Highway Administration Oversight**

For more than 30 years, the FHWA has annually assessed each state's bridge inspection program to evaluate compliance with the NBIS as defined in 23 CFR 650 Subpart C. In 2009, the Office of Inspector General (OIG) issued an audit report in regards to the National Bridge Inspection Program (NBIP): Assessment of FHWA's Implementation of Data-Driven, Risk-Based Oversight that summarized their review of the FHWA oversight of the NBIP. One of the five OIG recommendations from this audit was for FHWA to develop and implement minimum requirements for data-driven, risk-based bridge oversight during the division engineer's annual NBIS compliance review. In response to the OIG recommendations and congressional direction, FHWA developed a new systematic, data-driven, risk-based oversight process for monitoring state compliance with the NBIS.

The FHWA developed and implemented the current review process to evaluate a state's bridge inspection program for compliance with the NBIS in 2011 as currently required by 23 U.S.C. 144(h)(4)(A). Each FHWA division office annually assesses the state's compliance with 23 individual metrics which are directly aligned with the existing NBIS regulation. The metrics, or measures, are designed to assess the quality and performance of each state's bridge inspection program and collectively, the national program that has been established to assure highway bridges are safe.

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The risk-based assessment process followed during this annual assessment utilizes objective data, employs statistical sampling of data and inspection records, and includes defined criteria for compliance for each metric. States are notified by FHWA of any findings of noncompliance no later than December 31. In accordance with the requirements of 23 U.S.C. 144 as established by MAP-21, within 45 days of the FHWA notification of noncompliance, the state will correct the issue of noncompliance or submit a Plan of Corrective Action (PCA) to FHWA. The PCA will outline how noncompliant findings will be addressed. The FHWA will have 45 days for review, comment, and if appropriate accept the PCA. Final compliance determinations by FHWA are to be made no later than March 31. This annual process allows the FHWA to assess NBIS compliance by each state's bridge inspection program and implement any required penalties in a nationally consistent manner.

The description and criteria for evaluating the inspection program are described in FHWA's NBIS Oversight Program, Metrics for the Oversight of the National Bridge Inspection Program. Each of the 23 metrics are annually assessed and assigned one of four compliance levels:

Compliant: Adhering to the NBIS regulation.

Substantially Compliant: Adhering to the NBIS regulation with minor deficiencies. These deficiencies do not adversely affect the overall effectiveness of the program and are isolated in nature. Documented deficiencies are provided to the state with the expectation that they will be corrected within 12 months or less, unless the deficiencies are related to issues that would most efficiently be corrected during the next inspection. A written response to the FHWA describing the expected corrective action is required.

Noncompliant: Not adhering to the NBIS regulation. Identified deficiencies may adversely affect the overall effectiveness of the program. Failure to adhere to an approved PCA is also considered noncompliance.

Conditionally Compliant: Taking corrective action in conformance with an FHWA approved PCA to achieve compliance with the NBIS. Deficiencies, if not corrected, may adversely affect the overall effectiveness of the program.

### **1.04 Organization and Responsibilities**

The NBIS defines that the state's transportation department is responsible for establishing bridge inspection policies and procedures. The state must document roles and responsibilities, maintain a registry of nationally certified bridge inspectors, and document the criteria for inspection intervals. The state is also responsible for completing quality assurance and quality control, producing valid load ratings, and preparing and maintaining the bridge inventory. This includes managing bridge inspection reports and files, scour appraisals and scour plans of action, corrective actions taken in response to a critical finding, and other requirements of these standards.

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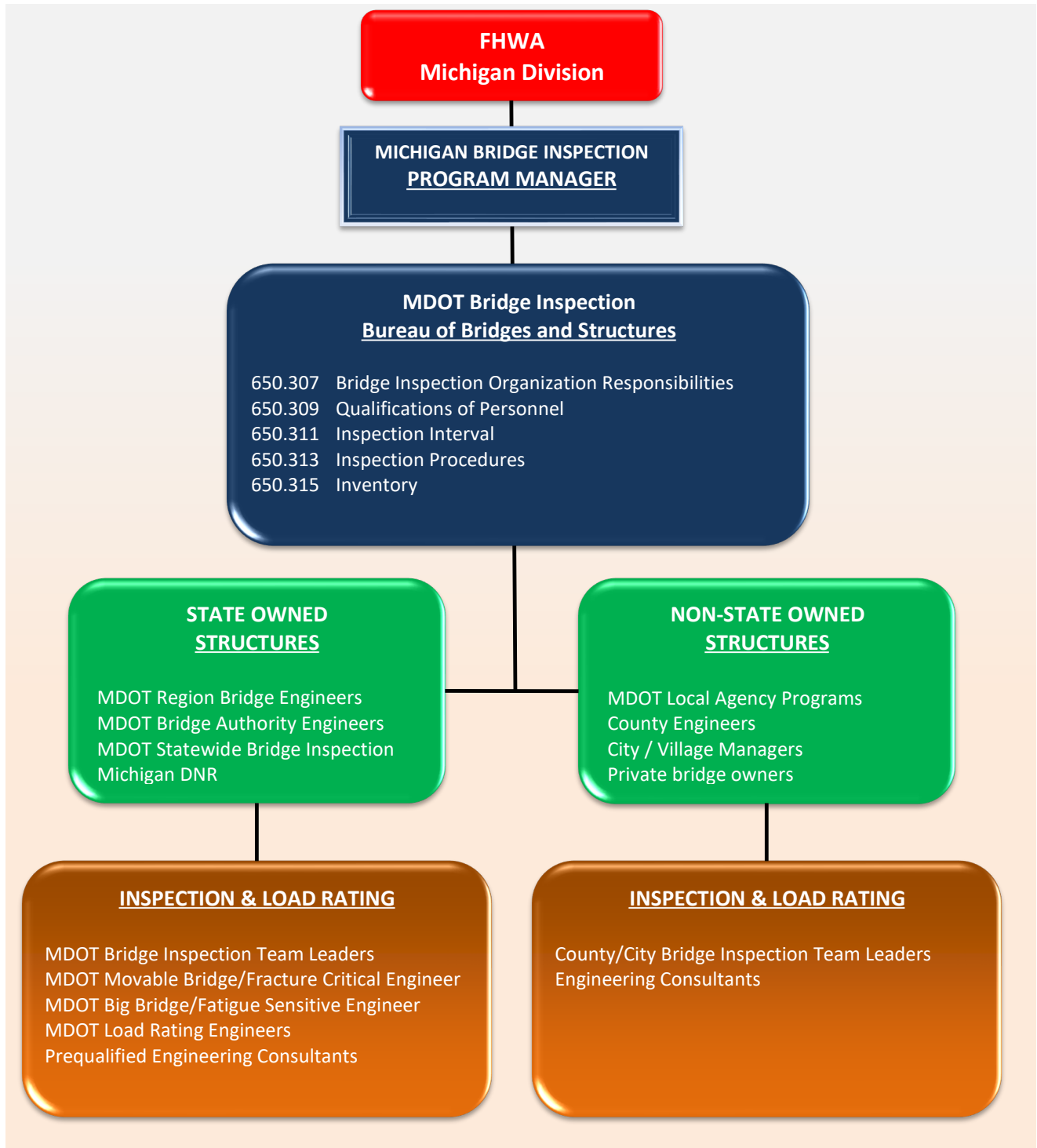
The provisions of the NBIS allow portions of these requirements to be delegated, however delegation does not relieve the state's transportation department of the overall responsibility. The organization of MDOT's bridge inspection program is shown in Figure 1.04.01.

### **1.04.01 Bridge Program Manager**

As outlined in the NBIS, the state transportation department's bridge inspection organization must have a Bridge Program Manager with specific qualifications and responsibilities. There are several levels of administration and management for the statewide bridge inspection program. The MDOT Bureau of Bridges and Structures is responsible for maintaining compliance with the NBIS. The responsibilities include the following:

- Development of policies and procedures for bridge inspection and load rating
- Development and analysis of bridge information for statewide planning needs
- Collection and management of all bridge inventory, inspection, and load rating data
- Maintenance and operation of the state's database and web application
- Reporting NBI and element level data to FHWA
- Completing quality assurance reviews for state, local, and private bridge owners
- Maintenance of a training and certification program for bridge inspection team leaders
- Coordination of a statewide scour assessment program
- Oversight of the load rating and posting of state, local, and privately maintained structures
- Operation and maintenance of under-bridge inspection equipment
- Reporting the activities and corrective actions taken in response to a critical finding
- NBIS compliance for all bridges in the State of Michigan

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*Figure 1.04.01 MDOT Bridge Inspection Organization*

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### BUREAU OF BRIDGES AND STRUCTURES

The Bureau of Bridges and Structures serves as a statewide resource to achieve and maintain alignment on all field related bridge issues, and provides technical guidance for construction, maintenance and safety inspection of bridges and structures. The Bureau of Bridges and Structures also provides around-the-clock responses to structure damage and other emergency bridge situations around the state. The specific roles and responsibilities for inspection that are managed by the Bureau of Bridges and Structures are described below:

FHWA NBIS Compliance and Metric Reviews: The Bridge Inspection Program Manager is responsible for working directly with FHWA’s Michigan Division Bridge Engineer for reviewing and resolving potential NBIS compliance issues. Although the metric reviews are completed annually, coordination between MDOT and FHWA is a daily activity.

Qualifications of Personnel: The Statewide Bridge Inspection Unit is responsible for reviewing and ensuring that the program manager, team leaders, and divers performing tasks relative to the NBIS meet the minimum qualifications. The unit is also responsible for verifying recurrent training documentation for team leaders. Team leader reviews for individuals not registered as professional engineers are evaluated thoroughly on a case-by-case basis. Refer to Section 1.05.02 for additional information.

The Bridge Load Rating Unit is responsible for ensuring that all load analyses are completed or reviewed by a professional engineer registered in the State of Michigan. In addition, the Bridge Load Rating Unit is responsible for the coordination and scheduling of Load Rating Workshops and training performed throughout the State of Michigan.

Inspection Timeliness and Interval Criteria: The Statewide Bridge Inspection Unit is responsible for developing methods and policies to ensure timely inspections. In addition, the unit will review compliance criteria of all agencies in accordance with FHWA and MDOT timeliness policies. It is the Bridge Inspection Unit’s responsibility to develop, maintain and implement recommended bridge inspection frequencies in accordance with the NBIS and MDOT polices.

Bridge Inspection Procedures: The Statewide Bridge Inspection Unit is responsible for providing and maintaining inspection procedures that meet the requirements and intent of the NBIS. The information in this manual provide guidance and clarification of those inspection procedures.

Critical Findings: The Statewide Bridge Inspection Unit is responsible for reporting the activities and corrective actions taken in response to critical findings.

Bridge Inspection Quality Assurance: The Statewide Bridge Inspection Unit is responsible for ensuring that quality inspection data is obtained to accurately reflect the conditions discovered during field inspections. Quality Assurance is completed on all agencies responsible for completing bridge inspections in accordance with the NBIS.

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Bridge Load Rating: The Bridge Load Rating Unit is responsible for ensuring all bridges are load rated to verify safe load carrying capacity in accordance with the NBIS. The unit is also responsible for developing and maintaining load rating guidance for assessing bridges within the State of Michigan for maximum legal loads.

Prepare and Maintain Inventory: The Bridge Management Systems Unit is responsible for maintaining the statewide database and organizing the data so it may be transmitted annually to FHWA Washington Headquarters. Throughout the year the unit also reviews the data for compliance deficiencies or errors and works to resolve them with the appropriate agency or individual. The unit also creates bridge records and reviews plans to ensure the structure inventory coding is accurate.

### **1.04.02 Bridge Owner**

All bridges and structures within the inventory are delegated to a bridge owner for responsibility and management. Subsets of bridge owners for the structures regulated by the NBIS exist in the State of Michigan. Most of the structures fall under the ownership of a state agency or local agency; however, private owners exist. State agency bridge owners include MDOT, the Department of Natural Resources (DNR), the Department of Management & Budget (DTMB), and several public universities. The local agency bridge owners include counties, cities, villages, and townships throughout the state. Private structures are owned and operated by utility and toll companies.

The primary role of the bridge owner is to ensure that timely and accurate bridge safety inspections and load rating analyses are completed for all the structures within their jurisdiction. Bridge owners are also responsible for ensuring that quality control activities were conducted on at least 5 percent of the inspections performed annually by each team leader.

**MDOT Statewide Bridge Owners:** Large deck, unique, and movable bridges are owned by the Bureau of Bridges and Structures. Due to the complex nature of the structures, maintenance and management oversight from the central office allows for efficient diagnosis of issues that arise by a team of specialists including the Statewide Bridge Repair Crew.

**MDOT Region Bridge Owners:** All region bridge engineers serve as the bridge owner of structures meeting NBIS length requirements on state-owned routes within their jurisdiction. Every region bridge engineer should be a licensed professional with the necessary training to be a team leader.

**Local Agency Bridge Owners:** County, city, village, and township managers serve as the bridge owners within their designated unit of local government. Very few local agency bridge owners are professional engineers or have the required experience to meet team leader status. These bridge owners consult the majority of bridge inspections and load ratings to consulting firms with qualified staff.

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**Bridge Authorities:** Two bridge authorities exist within the State of Michigan for managing two of the most well-known structures in the area. The Mackinac Bridge Authority preserves and maintains the longest suspension bridge in the Western Hemisphere, connecting the two peninsulas of the state. The International Bridge Authority joins northern Michigan to Ontario, Canada creating a vital corridor for international trade and tourism within the region.

**Private Bridge Owners:** The individual or company with ownership of a structure that has public roadway at each end of the bridge. Very few private bridge owners are professional engineers, and none currently have the required experience to meet team leader status. These bridge owners must consult bridge inspections and load ratings to consulting firms with qualified staff.

### **1.04.03 Team Leader**

The team leader is responsible for leading the structure inspection team and planning, preparing, and performing structure inspections in accordance with the NBIS regulations. The team leader is ultimately responsible for preparing the inspection report and submitting the information to MDOT. The team leader shall be familiar with this manual and preferably have a background in such areas as structural engineering, structure behavior trends, bridge maintenance, and rehabilitation techniques. Safety items can include ensuring each inspection team member complies with safety procedures and proper use of access equipment. A team leader must be at the structure during the entirety of each routine, fracture critical, or underwater NBI inspection and is responsible for entering the inspection report. Data entry cannot be delegated to another individual.

#### **MDOT Statewide Team Leaders**

MDOT team leaders include engineering managers, engineering specialists, transportation engineers, and transportation maintenance workers each meeting team leader requirements. These individuals serve in multiple areas throughout MDOT and are responsible for performing a variety of activities related to the Michigan Bridge Inspection Program. Team leaders who regularly perform field evaluations or provide scoping oversight include the following:

#### **Statewide Fracture Critical Inspection Engineer**

The Statewide Fracture Critical Inspector is responsible for performing a hands-on inspection of all bridges containing fracture critical elements within the MDOT inventory. This includes annual inspections for movable, complex, and non-redundant bridges and additional inspections for non-NBI structures as agency policy permits.

#### **Statewide Big Bridge and Fatigue Inspection Engineer**

The Statewide Fatigue Sensitive Inspector is responsible for the inspection of bridges containing AASHTO Fatigue Categories with low levels of fatigue resistance in the MDOT inventory. There are currently nearly two-hundred load path redundant structures that receive the special inspection approximately every three years. In addition, the Statewide Fatigue Sensitive Inspector performs routine NBI inspections of MDOT owned bridges with more than 100,000 square feet of deck area.



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### **Big Bridge Engineer**

The Big Bridge Engineer is responsible for scoping MDOT’s large deck, segmental, tied arch, and cable stayed bridges throughout the state. The Big Bridge Engineer also develops bridge scoping and preservation guidelines and worksheets for use throughout the state.

### **Statewide Emergency Coordination Engineer**

The Statewide Emergency Coordination Engineer provides field review and repair expertise of damaged structural elements caused by vehicular, vessel, fire, or malfunctioning movable bridge systems. Regularly scheduled duties include the design and scheduling of various repairs that must be installed prior to the next scheduled routine inspection. This repair work is conducted by the Statewide Bridge Crew which consists of a talented team of certified welders who are proficient in heat straightening, welded beam end repairs, temporary support installation, movable bridge repair, and many other aspects that benefit the MDOT inventory.

### **MDOT Region Team Leaders**

In addition to the region bridge owner, each region utilizes multiple staff that meet team leader requirements to complete the majority of routine inspections. These individuals are classified as Transportation Engineers or Transportation Maintenance Workers and have a variety of previous experience in the construction, maintenance, and/or design of bridges.

### **Consultant Team Leaders**

Consultant team leaders performing services for MDOT, local, and private bridge owners are often delegated responsibilities for ensuring compliance with the NBIS. Vendor personnel managing the contracts should review the bridge owner’s inventory for data irregularities or compliance deficiencies. If any factors exist that could result in the agency being held in non-compliance the consultant team leader should notify the bridge owner and propose additional services to resolve the issues.

## **1.05 Qualifications**

Minimum qualification requirements are defined in the NBIS Section 650.309 Qualifications of Personnel. Qualification requirements are assessed annually by FHWA for compliance with the NBIS using the criteria specified in the following sections:

Qualifications of Personnel – <b>Program Manager</b>	NBIS 650.309(a)
Qualifications of Personnel – <b>Team Leader(s)</b>	NBIS 650.309(b)
Qualifications of Personnel – <b>NSTM Team Leader(s)</b>	NBIS 650.309(c)
Qualifications of Personnel – <b>Load Rating Engineer</b>	NBIS 650.309(d)
Qualifications of Personnel – <b>Underwater Diver</b>	NBIS 650.309(e)

Consultants interested in professional service contracting with MDOT in the classifications of Bridge Load Rating Analysis, Bridge Safety Inspection, and Underwater Bridge Inspection must be prequalified to

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submit proposals for contracting. See MDOT's Consultant Prequalification Application Instructions for additional staff education and experience requirements.

### **1.05.01 Bridge Program Manager Qualifications**

The Bridge Program Manager is the individual in charge of the bridge inspection program for a particular state who has been assigned the duties and responsibilities for bridge inspection, reporting, and inventory. The Bridge Program Manager provides overall leadership for the program and is available to the bridge owners, team leaders and engineering consultants to provide guidance. The qualification requirements of a Bridge Program Manager include all of the following:

- Be a registered professional engineer or have 10 years of bridge inspection experience;
- Successfully complete an FHWA-approved comprehensive bridge inspection training course;
- Has completed a cumulative total of 18 hours of FHWA approved bridge inspection refresher training.

### **1.05.02 Team Leader Qualifications**

Michigan bridge inspection program policy requires the FHWA comprehensive course, the qualifications and recurrent training hours specified by the NBIS, and the field proficiency exam administered by the state. It is the responsibility of each individual to maintain and submit all documentation prior to their expiration dates.

#### **Comprehensive Course**

An individual wanting to complete bridge safety inspections in accordance with the NBIS must complete a FHWA approved comprehensive bridge inspection training course such as NHI-130055 Safety Inspection of In-Service Bridges. Licensed professional engineers may complete NHI-130056 Safety Inspection of In-Service Bridges for Professional Engineers.

#### **Qualifications**

In addition to completing the comprehensive bridge inspection training course, individuals must meet one of the following:

1. Be a registered professional engineer and have six months of bridge inspection experience;
2. Have (5) years of documented bridge inspection experience;
3. Have all of the following:
  - a. Bachelor's degree in engineering or engineering technology from a college or university accredited by or determined as substantially equivalent by ABET;
  - b. Successfully passed the National Council of Examiners for Engineering and Surveying Fundamentals of Engineering exam;
  - c. (2) years of bridge inspection experience.
4. Have all of the following:

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- a. An associate's degree in engineering or engineering technology from a college or university accredited by or determined as substantially equivalent by ABET;
- b. (4) years of bridge inspection experience.

Bridge inspection experience is reviewed and evaluated by the MDOT Bridge Inspection Program Manager. Experience may be gained by assisting or participating in routine NBI inspections performed by a team leader or through technical experience in bridge design, bridge maintenance or bridge construction. One year of experience toward meeting the NBIS requirements may be granted for every:

- 100 routine NBI inspections performed with a team leader.
- 3 years technical experience in bridge design, bridge maintenance or bridge construction, where more than half of the tasks performed annually were directly related to bridges and culverts.

Individuals must submit the [Team Leader Qualifications](#) form for approval to MDOT.

### **Field Proficiency Exam (FPE)**

Effective January 1, 2020, the requirements to become and maintain status as a team leader were strengthened to improve the quality of the Michigan Bridge Inspection Program. The requirements affect every team leader performing initial, routine, element, in-depth, fracture critical, and underwater inspections on NBI structures.

The improvements to the program included the addition of a field proficiency exam administered by the Michigan Department of Transportation (MDOT). Each individual must successfully pass the exam every 24 months to maintain team leader status. The exam requires two bridge inspections to be conducted in the field and includes questions tailored towards deficiencies identified during MDOT's annual quality assurance reviews.

MDOT will maintain a list of bridges to be utilized for the field portion of the exam at [www.michigan.gov/bridgeinspectQTL](http://www.michigan.gov/bridgeinspectQTL). Every effort will be made to provide two structures in at least four of the seven MDOT regions to reduce travel time for inspectors. Blank reports, standardized spreadsheets, and a list of questions will be available online.

The individual taking the exam must perform a field inspection for two bridges from the list, provide accurate condition ratings for each item on the Bridge Safety Inspection Report (BSIR) with comments to support the condition coding, complete the element inspection, and answer a variety of inspection related questions. Completed exams must be emailed to [MDOT-MiBRIDGE-Admin@michigan.gov](mailto:MDOT-MiBRIDGE-Admin@michigan.gov).

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The exam will be evaluated according to the following breakdown until implementation of the SNBI:

Category	Percentage of Overall Exam
SI&A Item 58 Deck condition rating and supporting comments	20%
SI&A Item 59 Superstructure condition rating and supporting comments	20%
SI&A Item 60 Substructure condition rating and supporting comments	20%
All other BSIR condition ratings and supporting comments	10%
Element inspection quantities and condition states	10%
Supplemental inspection questions regarding National or Michigan program policy	20%

The exam will be evaluated according to the following after the SNBI implementation is effective:

Category	Percentage of Overall Exam
B.C.01 Deck condition rating and supporting comments	15%
B.C.02 Superstructure condition rating and supporting comments	15%
B.C.03 Substructure condition rating and supporting comments	15%
B.C.05 Bridge railing condition rating and supporting comments	5%
B.C.07 Bridge bearings condition rating and supporting comments	5%
B.C.08 Bridge joints condition rating and supporting comments	5%
B.C.11 Scour condition rating and supporting comments	5%
All other BSIR condition coding and supporting comments	5%
Element inspection quantities and condition states	10%
Supplemental inspection questions regarding National or Michigan program policy	20%

Failure to submit the necessary documentation and achieve a score of at least 80% will result in the restriction of MiBRIDGE user rights and the inability to enter inspection reports until the exam is successfully passed. Time extensions for completing the exam will not be granted due to inclement weather, workload, or equipment failure. Inspectors are encouraged to plan ahead to ensure that their team leader status does not lapse.

The MDOT Bridge Inspection Program Manager will evaluate each submitted exam and assign an overall score within 30 days of receiving the document. Team leaders will be notified by email whether they received a pass or fail score for the exam. When a team leader receives a failing score, the exam may be retaken using two new structures. If a team leader fails two consecutive exams, a meeting will be held to discuss the deficiencies noted and develop a corrective action plan.

**Recurrent Training**

Team leaders must complete 18 hours of approved bridge inspection recurrent training over a 60-month period. The NHI courses listed in the table below are the only means approved to satisfy recurrent training requirements:

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<b>NHI Classes - Instructor Led (ILT)</b>		
<b>NHI Class</b>	<b>Title</b>	<b>Credit (hrs)</b>
130055	Safety Inspection of In-Service Bridges	67
130056	Safety Inspection of In-Service Bridges for Professional Engineers	34
130053	Bridge Inspection Refresher	18

NHI courses approved for recurrent training are hosted by MDOT and the American Council of Engineering Companies of Michigan (ACEC). Team leaders may explore course offerings in other states to fulfill their recurrent training requirement.

Team leaders should provide documentation to the bridge owner showing that they meet team leader requirements prior to performing NBI bridge safety inspections.

**1.05.03 Underwater Bridge Inspection Diver**

The individual performing the inspection of submerged elements using diving methods must complete an FHWA approved underwater bridge inspection training course. Effective June 6, 2022 NHI-130091 is the only approved FHWA training for new diving inspectors. Completion of NHI-130055 or NHI-130056 prior to June 6, 2022 fulfills the FHWA training requirement.

There is no recurrent training requirement; however, MDOT highly recommends that inspection divers complete additional training within a 5-year period to remain knowledgeable of current inspection procedures and technologies used for completing underwater bridge inspections.

All underwater diving operations are subject to the requirements specified under 29CFR Part 1910, Commercial Diving Operations. Please see [Chapter 8, Underwater Inspection](#) for additional information for those completing underwater inspections.

**1.05.04 Load Rating Engineers**

The NBIS requires the individual charged with the overall responsibility for load rating bridges to be a registered professional engineer. As stated in the MDOT Bridge Analysis Guide, it is recommended that this individual have a minimum of 5 years of bridge design and inspection experience. MDOT requires all load rating analyses to be either analyzed by or checked by a professional engineer registered in the State of Michigan. The engineering skills and knowledge necessary to properly evaluate bridges may vary widely depending on the complexity of the bridge involved. The specialized skills and knowledge of other engineers may be needed to ensure proper evaluation. A load rating engineer is responsible for providing accurate load ratings for bridges in which they performed the analysis.

**1.05.05 Competent Staff**

Bridge owners, maintenance workers, and other competent staff may perform high flow monitoring,

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scour inspections, other special, and non-NBI routine inspections as required. This work may be completed by any individual that has a basic understanding of structural bridge foundations, stream bed scour, and basic load path knowledge. In order to document these reports individuals must be registered in MiBRIDGE.