

BRIDGE ADVISORY NUMBER: **BA-2014-02**

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SUBJECT: **Michigan Structure Inspection Manual (MiSIM)**

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PURPOSE

The Michigan Department of Transportation is currently developing a Michigan Structure Inspection Manual (MiSIM) which will provide additional guidance and clarification for the inspection of bridges, culverts, and earth retaining systems. This manual is a supplement to the FHWA Bridge Inspection Reference Manual (BIRM) and AASHTO manual and guides that are related to bridge safety inspection.

The MiSIM will be used by FHWA, MDOT, Local Agency Bridge Owners and Engineering Consultants to reference and clarify the requirements set forth by the National Bridge Inspection Standards (NBIS) and MDOT.

Although this Manual's purpose is to support the bridge inspection program, it does not preclude justifiable exceptions or actions based on sound inspection or engineering judgment.

The NBIS and Michigan Bridge Inspection Program objectives include:

- Safeguarding the public's safety;
- Assuring the information submitted to the Michigan Bridge Inventory, and subsequently to the Nation Bridge Inventory, maintains a high degree of accuracy and consistency;
- Protection of the capital assets of the Michigan Department of Transportation and Local Agencies.

The MiSIM manual will be released as chapters are completed. These chapters will be published on MDOT's Bridge operations website which can be found by following this link: http://michigan.gov/mdot/0,1607,7-151-9625_24768---,00.html

As a result the annual FHWA Bridge Inspection Program Reviews commitments and priority for completing certain sections of the MiSIM was determined. The following chapters of the MiSIM have been completed to address the deficiencies found during NBIS compliance reviews:

Chapter 2	Quality Assurance & Quality Control
Chapter 3	Inspection Frequency
Chapter 4	Bridge Files
Chapter 7	Fracture Critical & Fatigue Sensitive Inspection Procedures
Chapter 10	Critical Findings

Each chapter summarizes the responsibilities of key personnel involved with the bridge inspection program and provides minimum requirements as it relates to the NBIS program and bridge safety inspection.

Below are brief summaries for the completed chapters. Please review these chapters in detail. Please send comments or suggestions to MDOT-BridgeInspection@michigan.gov.

CHAPTER 2 Quality Assurance (QA) & Quality Control (QC)

This chapter summarizes the responsibilities of each team member and minimum requirements for quality assurance and quality control as it relates to the NBIS program and bridge safety inspection.

Each organization is required to maintain QC procedures in a separate bridge file that are to be utilized on an annual basis or more often if deficiencies in the inspection or load rating processes are regularly identified. QC reviews are to be completed by a qualified team leader that did not perform the original bridge inspection being reviewed.

Each agency must complete QC file reviews on at least 5 percent of the inspections and load ratings performed by each individual per year. Further action will occur with conducted field reviews on at least 50 percent of the files selected. The agency completing the QC must have a method to document that QC procedures are being followed. If QC procedures cannot be verified or deficiencies are discovered during the QA process the QC file review will be increased to 10 percent until the next review.

CHAPTER 3 Inspection Frequency

Bridge inspections must be performed according to their designated frequency to ensure public safety, protect infrastructure investment, and maintain FHWA compliance. Failure to perform the inspections may lead to the restriction of federal funds, and unknown condition states within the inventory.

Inspections should be assigned to an inspection team leader at least 30 days prior to the inspection due date. This action will allow inspection staff adequate time to arrange for necessary items to complete the inspection on time.

Due to the importance of adhering to the regulations MDOT is instituting stricter guidelines for bridge safety inspection reporting. **Effective October 1, 2014 all bridge safety inspections performed shall be entered into MiB^{RIDGE} within 30 days of the field work for the inspection.** This policy change has been approved by FHWA to strengthen the performance of Michigan's bridge inspection program by allowing timeliness verifications to be conducted 60 days earlier than current regulations require, and will increase compliance during National Bridge Inspection Program reviews.

CHAPTER 4 Bridge Files

The bridge file should contain the necessary components that are identified in Section 2 of the AASHTO Manual for Bridge Evaluation (MBE). At a minimum, the bridge file must contain current records of all that apply:

- Plan Drawings
- Photos
- Bridge Safety Inspection Reports
- Structure Inventory & Appraisal
- Load Rating documentation
- Channel Cross Sections
- Scour Assessment and Plan of Action
- Flood Data and Waterway Adequacy
- Significant Correspondence
- Critical Findings

CHAPTER 7 Fracture Critical & Fatigue Sensitive Inspection Procedures

The NBIS requires the identification of bridges that have one or more Fracture Critical Members (FCMs) and the development of inspection procedures for each bridge due to the importance of monitoring components without structural redundancy. Michigan currently has over 160 bridges that contain fracture critical members, and over 85 percent were constructed prior to the enactment of specific fabrication guidelines and material testing for FCMs. The proper identification of FCMs and the implementation of inspection procedures are necessary to preserve such substantial transportation infrastructure assets.

The NBIS requires FCMs to be inspected at arms-length which often requires the use of inspection equipment and traffic control that is not normally required during a routine safety inspection.

Bridges with FCM's require additional detailed information to be included in the file. Plan sheets that delineate FCMs for both the superstructure and substructure components must be readily accessible. These drawings should be highlighted so the elements and FCMs may be readily identified by the inspection team leader and quality assurance review team.

The inspection procedures must be documented for these high risk structures which will include bridge specific procedures and instances where unique information is required to facilitate the inspection. **All FCM inspections performed after October 31, 2014 must include bridge specific procedures for the inspection.** These procedures will be collected in the MiB^{RIDGE} web application.

CHAPTER 10 Critical Findings

The National Bridge Inspection Standards (NBIS) mandate the establishment of a statewide procedure to confirm that critical findings are resolved immediately and that actions performed to mitigate the deficiencies are recorded. These findings must be reported by MDOT to the FHWA on a quarterly basis.

A critical finding is a structural or safety related deficiency that requires immediate follow-up inspection or action. MDOT's definition for a critical finding includes any instance where an entire bridge, lane, or shoulder is closed to protect public safety due to the condition of a bridge element, or damage sustained by a bridge element. Examples of critical findings include:

- Bridges with recommendations for immediate work on fracture critical bridge members;
- Bridges with recommendations for immediate correction of scour or hydraulic problems;
- Bridges with condition ratings of 2 or less for the Deck (Item 58), Superstructure (Item 59), Substructure (item 60), or Culvert (Item 62);
- Bridges with recommendations for immediate work to prevent substantial reduction in the safe load capacity.

Documentation of critical findings for MDOT owned bridges are required to be reported on RFA form [1887](#), while local agency bridges are to be recorded on [1887-LA](#). Failure to act and document follow up on critical findings may result in the agency being held in non-compliance and the withholding of federal transportation funding. The bridge owner or owner's representative must email the RFA form to MDOT's bridge inspection program manager at MDOT-BridgeInspection@michigan.gov within 72 hours of completing an immediate action for a critical finding. MDOT Bridge Field Services staff will be responsible for contacting the FHWA Bridge Program Team Leader once notification from the MDOT or Local Agency bridge owner has been provided.

For questions regarding this bridge advisory please contact Rich Kathrens, MDOT Bridge Safety Inspection Engineer at (517) 749-4274 or Andrew Bouvy at (517) 242-1164 or by emailing MDOT-BridgeInspection@michigan.gov .