LOAD RATING & LOAD POSTING
METRIC FINDINGS & CORRECTIVE ACTIONS

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Michigan Department of Transportation

2019 Michigan Bridge Conference Workshop
Presentation Outline

• Metric 13 – Inspection Procedures: Load Rating Findings
• Metric 14 – Inspection Procedures: Post or Restrict Findings
• Plan of Corrective Action (PCA)
Metric 13 Findings

- Load rating unavailable
- Load rating not up to date
- Judgment ratings
  - Improperly used
  - Inadequately documented
- Documentation incomplete
- Timeliness
LOAD RATING
UNAVAILABLE

METRIC 13 FINDING
LOAD RATING NOT UP TO DATE

METRIC 13 FINDING
Physical Characteristics

<table>
<thead>
<tr>
<th>Historical Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year Built</strong></td>
<td>1955</td>
</tr>
<tr>
<td><strong>Year Painted</strong></td>
<td>1955</td>
</tr>
<tr>
<td><strong>Under Ctr. Measurement Year</strong></td>
<td>2016</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Material</strong></td>
<td>Steel</td>
</tr>
<tr>
<td><strong>Main Design Type</strong></td>
<td>Non Comp</td>
</tr>
<tr>
<td><strong>Approach Material</strong></td>
<td>Unknown (NBI)</td>
</tr>
<tr>
<td><strong>Approach Design Type</strong></td>
<td>Steel</td>
</tr>
<tr>
<td><strong>Steel Type</strong></td>
<td>Carbon Sti (A7, A 373)</td>
</tr>
<tr>
<td><strong>Paint Type</strong></td>
<td>Lead-base Paint</td>
</tr>
<tr>
<td><strong>Rail Type</strong></td>
<td>Conc Parapet Solid</td>
</tr>
<tr>
<td><strong>Rail Post Type</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Wearing Surface</strong></td>
<td>Bituminous</td>
</tr>
<tr>
<td><strong>Membrane Type</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Pin and Hanger</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Num/ Pin and Hanger</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Pedestrian Fencing</strong></td>
<td>Has Pedestrian Fence</td>
</tr>
<tr>
<td><strong>Footing Type</strong></td>
<td></td>
</tr>
</tbody>
</table>

LOAD RATING NOT UP TO DATE

METRIC 13 FINDING
6.1.4—Bridges with Unknown Structural Components

For bridges where necessary details, such as reinforcement in a concrete bridge, are not available from plans or field measurements, a physical inspection of the bridge by a qualified inspector and evaluation by a qualified engineer may be sufficient to establish an approximate load rating based on rational criteria. Load tests may be helpful in establishing the safe load capacity for such structures.

A concrete bridge or concrete bridge length culvert with unknown details need not be posted for restricted loading if it has been carrying normal traffic for an appreciable period and shows no distress. The bridge shall be inspected regularly to verify satisfactory performance.

MDOT Bridge Advisory 2012-2:

Engineering judgment alone shall not be used to determine the live load capacity of a bridge component when sufficient structural information is known to utilize a rational method of analysis and rating.
The appropriate rating(s) shall be determined by the engineer upon careful consideration of all available information including, but not limited to:

- Year of construction and material properties of members
- Assumed design (Inventory) loading and controlling Operating vehicle
- Measurable structural dimensions
- Condition of load carrying components
- Redundancy of load path
- Changes since original construction
- Comparable structures of known design
LOAD RATING
DOCUMENTATION INCOMPLETE

METRIC 13 FINDING
**LOAD RATING DOCUMENTATION INCOMPLETE**

**METRIC 13 FINDING**

<table>
<thead>
<tr>
<th>Live Load</th>
<th>Rating Factor</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS 20-44</td>
<td>1.275</td>
<td>Design Flexure - Stk</td>
</tr>
<tr>
<td>HS 20-44</td>
<td>2.129</td>
<td>Design Flexure - Stk</td>
</tr>
<tr>
<td>Michigan 1 Unit Truck 05-DL</td>
<td>1.931</td>
<td>Design Flexure - Stk</td>
</tr>
<tr>
<td>Michigan 2 Unit Truck 17-DL</td>
<td>1.260</td>
<td>Design Flexure - Stk</td>
</tr>
<tr>
<td>Michigan 2 Unit Truck 18-DL</td>
<td>1.288</td>
<td>Design Flexure - Stk</td>
</tr>
<tr>
<td>Michigan 3 Unit Truck 23-DL</td>
<td>1.388</td>
<td>Design Flexure - Stk</td>
</tr>
</tbody>
</table>
(d) For changes in load restriction or closure status, enter the SI&A data into the State or Federal agency inventory within 90 days after the change in status of the structure for State or Federal agency bridges and within 180 days after the change in status of the structure for all other bridges.
Metric 14 Findings

- Incorrect coding of NBI Items
- Posting sign missing in field
- Posting confirmation missing from file
- Posting sign inconsistent with MUTCD
INCORRECT CODING OF NBI ITEMS

METRIC 14 FINDING
INCORRECT CODING OF NBI ITEMS

METRIC 14 FINDING
POSTING SIGN Missing in Field

Metric 14 Finding
POSTING CONFIRMATION MISSING FROM FILE

METRIC 14 FINDING
POSTING SIGN INCONSISTENT WITH MUTCD

METRIC 14 FINDING
Metric 13 & 14 Plan of Corrective Action (PCA)

MDOT will send notification to local bridge owners clarifying their roles & responsibilities per the NBIS.

MDOT will develop a comprehensive QAQC program for local agency load ratings.

MDOT will develop & implement data checks in MIBridge to improve the accuracy of load ratings.
Local Bridge Owners Guide

Load ratings must:

- Reflect the current condition of the bridge
- Be updated when there is a change in condition
- Incorporate rehabilitation and reconstruction

Load rating data and pictures of weight limit signs must be uploaded into MiBRIDGE.
Statewide QAQC Contract

**Bridge Inspection & Load Rating**

- Load rating unavailable
- Load rating not up to date
- Judgment ratings
- Documentation incomplete
- Incorrect coding of NBI Items

**Annual QC Checks on:**

- Minimum of 20% of local agencies
- Minimum of 10% of agency’s bridge inventory

- Posting sign missing in field
- Posting confirmation missing from file
- Posting sign inconsistent with MUTCD
MiBRIDGE Enhancements

Incorrect coding of NBI Items

Posting sign inconsistent with MUTCD
MiBRIDGE Enhancements

- Future enhancements
  - Ability to upload XML files
  - Assumption form required fields
  - Judgment rating category on load rating dashboard
  - PE Verification check & unique analyzed by & reviewed by check

Warning!

- An image of the posting sign from each end of the bridge should be uploaded as part of this inspection report.
Metric 14 Plan of Corrective Action

MDOT WILL CREATE & IMPLEMENT A POLICY REQUIRING IMAGES OF POSTING SIGNS TO BE TAKEN WITH EACH ROUTINE INSPECTION & UPLOADED INTO MIBRIDGE

MDOT WILL PREPARE AND PUBLISH UPDATED LOAD POSTING GUIDANCE
Photographs of weight limit signs must be taken during each routine inspection and stored electronically in MiBRIDGE.

Applies to the weight limit signs at each end of the bridge, as well as any advanced warning signs.

Posting signs found to be missing, damaged, or vandalized should be replaced or repaired quickly.

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Bridge Advisory 2018-01: Load Posting Guidance
Bridge Advisory 2018-01: Load Posting Guidance

NBI ITEMS REQUIRED FOR LOAD POSTING
WEIGHT LIMIT SIGN GUIDANCE
TIMEFRAMES FOR IMPLEMENTATION

Incorrect coding of NBI Items
Posting sign inconsistent with MUTCD
Timeliness
## Internal Changes

#### New procedure for timeliness checks & contacting agencies with compliance issues

<table>
<thead>
<tr>
<th>6 Months Prior</th>
<th>5 Months Prior</th>
<th>4 Months Prior</th>
<th>3 Months Prior</th>
<th>2 Months Prior</th>
<th>1 Month Prior</th>
<th>Post Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email to Bridge Owner, notifying them of the NBI Compliance Issue and requesting a response that details their plan of action to resolve the issue, including an anticipated date of resolution.</td>
<td>Email to Bridge Owner, continuing the notification of the NBI Compliance Issue and requesting an update regarding action taken since the previous correspondence.</td>
<td>Email to Bridge Owner, continuing the notification of the NBI Compliance Issue and requesting an update regarding action taken since the previous correspondence.</td>
<td>Email to Bridge Owner, requesting an update regarding action taken since the previous correspondence.</td>
<td>Call Bridge Owner to discuss steps taken to resolve the NBI Compliance Issue.</td>
<td>Call Bridge Owner, renewing of the opening deadline and possible withholding of funds from the agency.</td>
<td>Bureau of Bridges and Structures staff will send a letter to the Bridge Owner stating that the local agency is in noncompliance with the National Bridge Inspection Standards (NBI). The determination to withhold funding will be made at the Bureau Management level according to the NBI condition rating assigned by the agency.</td>
</tr>
<tr>
<td>No action is necessary. None</td>
<td>No action is necessary. None</td>
<td>No action is necessary. None</td>
<td>No action is necessary. None</td>
<td>Call Bridge Owner, detailing the phone conversation.</td>
<td>Call Bridge Owner, detailing the phone conversation, and include the Bureau of Bridges and Structures Director, Local Agency Program Section Supervisor, TSC Manager, and most recent bridge inspector and/or load rating engineer in the correspondence.</td>
<td>Communication filed due to noncompliance with the NBI; transportation related funds may be withheld, and new projects may not be eligible. Contract to work with the agency to ensure action is taken. Provide regular status updates to Bureau of Bridges and Structures staff and Local Agency Program Section Supervisor regarding progress to complete the work.</td>
</tr>
</tbody>
</table>

#### Manual monthly review of load posting data

- Manual monthly review of load posting data.
Policy changes under consideration

- Require load rating documents & plans be uploaded into MiBRIDGE
- Require use of BrR when possible
- Issue updated judgment rating Bridge Advisory
- Add advanced warning sign verification to BSIR
- Add Item 141 vs. values on weight limit sign verification to BSIR
- Require inspectors to submit an RFA when posting sign is missing
Questions?

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