2019 Michigan Bridge Conference
Metrics 13 and 14
Bridge Load Rating and Posting
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Learning Outcomes

Metrics 13 and 14

• Describe the intent of each metric
• Describe the process for evaluating each metric and determining compliance

Creightyn McMunn will address issues identified in recent Intermediate Level review
Metric 13 Intent

- Verify that all bridges are rated for their safe load carrying capacity
  - In accordance with the AASHTO Manual for Bridge Evaluation (MBE)
  - For all
    - Legal vehicles, and
    - State routine permit loads
  - Up-to-date and documented properly (Metric 15)
Metric 13 – National Trend

![Graph showing metric 13 load rating trend from CY 2011 to PY 2018. The graph indicates an increasing trend in the percentage of satisfactory load ratings over the years.]

Legend:
- CY: Calendar Year
- PY: Fiscal Year

% Satisfactory:
- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

Trend Analysis:
The graph illustrates a noticeable upward trend in the percentage of satisfactory load ratings from CY 2011 to PY 2018. The percentages have increased from approximately 20% in CY 2011 to around 60% in PY 2018, indicating improvements in bridge safety and maintenance over the years.
Metric 13 Key Terms

• **Load rating determination** – the bridge has a load rating method and value recorded in the NBI
  – Op./Inv. Rating Method (Item 63/65 ≠ 5, no analysis)
  – Op./Inv. Rating (Item 64/66 ≠ 00.0 or blank)

• **Load rating documentation**
  – Provides a basis for the reported rating values
    • Rating summaries, calculations and computer input/output, or
    • Justification for assigned ratings and engineering judgement
Metric 13 Key Terms

• **Higher risk bridges** – Those bridges with:
  – NBI condition ratings of 4 (Poor) or less for Superstructure (Item 59), Substructure (Item 60), or Culvert (Item 62)
  – Item 70 ≤ 4 (posting required)
  – NBI appraisal rating of 3 or less for Item 67 (Structural Evaluation)
  – Bridges requiring load restriction (NBI Item 41 coded B, P or R),
  – Bridges with temporary supports (NBI Item 41 coded D)
  – Bridges with fracture critical members (FCM)
Metric 13 Min-AL

- Monitor PCA if in effect
- Review MAR13 Summary for indication of any new compliance deficiencies
- FHWA DBE knowledge of State Inspection program and previous NBIP reviews results
Metric 13 Int-AL

• In addition to the Min-AL:
  – Review MAR13 and
    • Resolve load rating compliance deficiencies to the extent necessary to assure that the compliance status shown is correct, and
    • Discuss identified load rating data inconsistencies with the State
• In addition to the Min-AL (con’t.):
  – Randomly sample bridges identified in the NBI as having load rating determinations and
    • Review the load ratings to verify that load rating calculations or documented determinations exist,
    • All legal vehicles were considered, and
    • Load ratings are consistent with current conditions
Metric 13 Int-AL

- In addition to the Min-AL (con’t.):
  
  - Include some bridges from this metric’s random sample in the Metric 12 and 22 field review sample to compare actual bridge conditions with those identified in the load rating.
Metric 13 Compliance Levels

• For Compliance:
  – All bridges have a NBI load rating determination
  – All sampled bridges have documentation in accordance with the MBE that supports the load rating determinations.
Metric 13 Compliance Levels

• For Substantial Compliance:
  – 100% of higher risk bridges and at least 95% of lower risk bridges have an NBI *load rating determination*
  – At least 90% of sampled bridges sampled have *documentation in accordance with the MBE that supports the load rating determinations.*
  – Ratings may have minor or isolated documentation deficiencies, but these do not adversely affect the accuracy of the rating
MAR13 Compliance Reports

• Report M13-3 – Is the bridge load rated?
  – Checks if Item 63 = 5
• Report M13-3a – Is the load rating reasonable?
  – Checks if Item 64 (Opr) > Item 66 (Inv)
• Report M13-3b – Is assigned rating allowed?
  – Checks for assigned ratings for bridges rated with Allowable Stress, or with reduced load capacity
Legal Loads

• What legal loads must be considered?
  – State-specific legal loads
  – AASHTO Legal Loads (Types 3, 3S2, 3-3, SHVs)
  – FAST Act Emergency Vehicles

• Be aware of State’s load rating policies
  – Screening loads and parametric studies
  – Posting evaluation triggers and procedures
Metric 13 Field Reviews

- At the Min-AL:
  - Compare field conditions with the overall load rating
  - Only obvious and substantial discrepancies
  - Findings regarded as additional knowledge and awareness
Metric 14 Intent

• Verify that bridges are posted or restricted
  – In accordance with the MBE, or
  – In accordance with State law

• Verify that posting deficiencies are promptly resolved
Metric 14 – National Trend

Metric 14 - Posting
% Satisfactory

- CY 2011
- PY 2013
- PY 2014
- PY 2015
- PY 2016
- PY 2017
- PY 2018
Metric 14 Min-AL

- Monitor PCA if in effect
- **Review and notify the State of posting deficiencies identified in the data submittal reports within 30 days of receiving the reports from the NBI administrator**
- Review MAR 14 and resolve all posting deficiencies identified
- Previous review results, the status of current posting deficiencies, and DBE knowledge and awareness of State load posting practices.
Metric 14 Int-AL

• In addition to the Min-AL:
  – Randomly sample bridges requiring posting, or are closed, and review the bridge files to verify that the documentation
    • Shows posting is properly implemented, and
    • Corresponds to the load rating recommendation
Metric 14 Int-AL

• In addition to the Min-AL (con’t.):
  – Include some bridges from this metric’s random sample in the Metric 12 and 22 field review sample, to verify that:
    • Posting signs exist, and
    • Are appropriate for the current load rating and posting recommendations
Metric 14 Compliance Levels

• For Compliance:
  – All bridges are properly posted or restricted
  – All identified posting/closing compliance deficiencies have been promptly resolved
• For Substantial Compliance:
  – All bridges are properly posted or restricted
  – Posting deficiencies have been promptly resolved, but no maximum timeframe for correction has been established or documented
MAR14 Compliance Reports

Posting Checks

• Report M14-1 – Operating Rating check
  – Checks if Item 64 < 20 mT and Item 41 ≠ “P”

• Report M14-2 – NBI “Bridge Posting” item check
  – Checks if Item 70 < 5 and Item 41 ≠ “P”

• Report M14-4 – NBI Item 41 check
  – Checks if Item 41 = “B”
National Bridge Inspection Program

MAR14 Compliance Reports

Closing Checks

• Report M14-5 – Condition Check
  – Checks if Items 59, 60, or 62 < 2 and Item 41 ≠ “K”

• Report M14-6 – Operating Rating check
  – Checks if Item 64 < 2.7 mT (3T) and Item 41 ≠ “K”
Metric 14 Field Reviews

• Use Sampling Tool to identify the Metric 14 bridges to be included in the Metric 12/22 sample

• Verify that
  – Posting signs exist, and
  – Are appropriate for the current load rating and posting recommendations
Learning Outcomes

Metrics 13 and 14

• Describe the intent of the metric
• Describe the process for evaluating the metric and determining compliance