



## ***2019 Michigan Bridge Conference*** **Metrics 13 and 14** **Bridge Load Rating and Posting** **Thomas Saad, P.E.**



U.S. Department of Transportation  
**Federal Highway Administration**



## 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

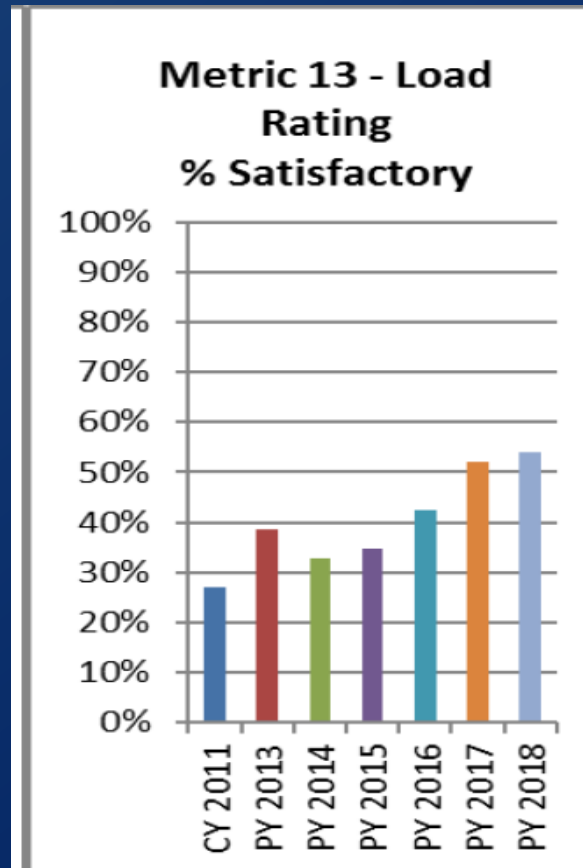


## Metric 13 Intent

- 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





## 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  $\neq$  5, no analysis)
  - Op./Inv. Rating (Item 64/66  $\neq$  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  $\leq$  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*





## Metric 13 Int-AL

- 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



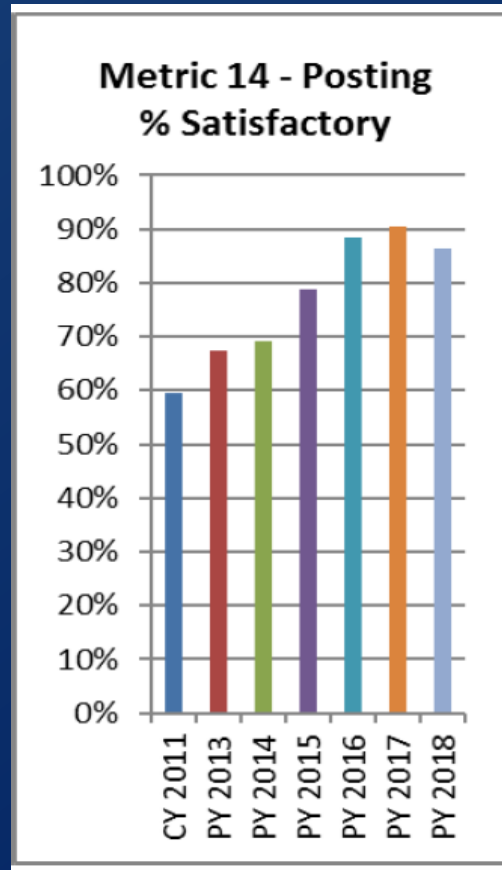


## Metric 14 Intent

- 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 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



## Metric 14 Compliance Levels

- 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  $\neq$  “P”
- Report M14-2 – NBI “Bridge Posting” item check
  - Checks if Item 70  $< 5$  and Item 41  $\neq$  “P”
- Report M14-4 – NBI Item 41 check
  - Checks if Item 41 = “B”



## MAR14 Compliance Reports

### Closing Checks

- Report M14-5 – Condition Check
  - Checks if Items 59, 60, or 62  $< 2$  and Item 41  $\neq$  “K”
- Report M14-6 – Operating Rating check
  - Checks if Item 64  $< 2.7$  mT (3T) and Item 41  $\neq$  “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