Indiana Bridge Load Rating Policies and Procedures

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INDOT Bridge Load Rating Policies

- INDOT Bridge Inspection Memo 16-06
  - Load Rating Requirement for New County Bridges
    - “New County bridges need to have a load rating performed in accordance with the Indiana Bridge Inspection Manual Part 3 at the time of the initial inspection. This requirement is not dependent on the source of funding used to construct the bridge. The load ratings are to be performed using AASHTOWare BrR. The County is responsible for providing the consultant performing the initial inspection and load rating with a set of as-built plans.”
INDOT Bridge Load Rating Policies

- INDOT Bridge Inspection Memo 16-02
  - Load Rating Policy Revisions (February 12, 2016)
    - “The Indiana Bridge Inspection Manual Part 3 has been revised. The revisions are effective immediately for all new bridge load ratings. Updated load ratings will be performed for all County owned bridges following the dates in the attached spreadsheet.”
    - “AASHTOWare BrR is the program to be used to load rate all bridges. The list of vehicles required for load ratings has been revised. The changes to Part 3 are to get Indiana in compliance with the AASHTO Manual for Bridge Evaluation (MBE).”
      - The provisions of the Bridge Inspection Manual, Part 3 (3-6.03) govern when a bridge can be load rated using Engineering Judgement
      - Load Rating updates to BrR should be on schedule with the Scour Plans which begin in 2017
Engineering Judgment (Current Policy)

Indiana Bridge Inspection Manual 3-6.03

“In case of bridges with unknown structural components where details, plans are not available such as reinforcement or field measurements are not possible, engineering judgment may be used for concrete bridges (MBE 6.1.4). A field inspection of the bridge by a qualified inspector and evaluation by a qualified professional engineer is sufficient to establish an approximate load rating based on rational criteria. The criteria established are a) There are no plans or details available b) It is a concrete superstructure c) The condition rating is at least 6 and there is no change in its condition from the previous inspection d) The physical inspection reveals that the bridge has been carrying normal traffic without distress due to live load e) It is evaluated and signed as well as sealed by a qualified PE (ATL-S) or a Load Rating Engineer (PE). A sample document is shown in Figure 3:6-4.”
Load Rating For Deterioration

Rating Elements To Discuss

- Steel Beams
- Reinforced Concrete Beams and Slabs
- Prestressed Concrete Beams
- Trusses
- Substructures
Load Rating For Deterioration

- **Steel Beams**
  - Section Loss of Tension Flange
    - Input loss of thickness in BrR
  - Section Loss of Compression Flange
    - Input loss of thickness in BrR
  - Crack in Flange
    - Options
  - Collision Damage of Flange / Web
Load Rating For Deterioration

- **Steel Beams**
  - Section Loss of Web
    - Input loss of thickness in BrR as average web thickness
  - MDOT RC 1454 (Michigan Tech Study)
    - Provides tables correlating web loss to residual capacity for W-Beams
Load Rating For Deterioration

- **Steel Beams**
  - Holes in Web
    - Input reduced average web in BrR
    - AISC Design Guide 2 (Dr. David Darwin, Univ. of Kansas)
Load Rating For Deterioration

- **Reinforced Concrete Beams and Slabs**
  - Spalling / reinforcing section loss
    - Reduce area of reinforcing based on section loss
  - Concrete Deterioration in Compression Zone
    - Testing
      - Reduce compressive strength in BrR
    - Use Condition Reduction Factors from MBE
Load Rating For Deterioration

- **Prestressed Concrete Beams**
  - **P/S Box Beams**
    - Exposed Strands (BrIM 3-8.06)
      - Box-Beams: Remove visible and adjacent strands
      - I-Beams: Consider removing exposed strands, or debonding from the end of the beam to a point beyond the exposed strand
  - Top Flange Concrete Deterioration
    - Testing
      - Reduce compressive strength in BrR
      - Use Condition Reduction Factors from MBE
    - Cracked Bottom Flange due to Ice expansion inside void
Load Rating For Deterioration

- **Trusses**
  - Tension Member Section Loss
    - Input Reduced Member Capacity in BrR
  - Compression Member Section Loss
    - Input Reduced Member Capacity in BrR
  - Compression Member Distortion
    - Thresholds for reduction
  - Rivet Head Section Loss
Load Rating For Deterioration

- **Trusses**
  - Gusset Plate Deterioration
    - Calculate Capacity Reduction
    - Input Capacity in BrR
Load Rating For Deterioration

- Substructure
  - Loss of Bearing Area
  - Exposed Pile Deterioration