Indiana Bridge Load Rating And Posting

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Why is it Important?

- Independent check to find bugs/errors during design
- Tool to consider deterioration in determining safe load capacity
- Tool for analyzing & authorizing overweight permitting loads
Main Topics

• Modernization of Policy
  • Status Update for Part 3 of the Bridge Inspection Manual
  • Definition of Terms (LFR vs LRFR)
  • Frequency of Ratings
  • Load Rating Vehicles

• Documentation/Submittal Process
  • Creating Reports in BIAS
  • Uploading Documentation to ERMS
  • Upcoming Changes
Modernization of Policy

Status of Revisions to Part 3 of the Bridge Inspection Manual

• Submitted revisions to FHWA
• Implementation as soon as final approval has been received

What’s new/different?

• Written with a heavy preference toward LRFR
• Redefines vehicle requirements and rating classifications
• Clarifies required documentation and submittal deadlines
• Defers to the Manual for Bridge Evaluation (MBE) for most load rating topics
Modernization of Policy

Load Rating Methods
- Load Factor Rating (LFR)
- Load and Resistance Factor Rating (LRFR)

Which one can we use?

It depends on the Design Method of the primary load carrying members
- LFD → LFR or LRFR
- LRFD → LRFR only
Modernization of Policy

Definition of Terms (LFR vs LRFR)

- Load Factor Rating (LFR)
  - Inventory
  - Operating
- Load & Resistance Factor Rating (LRFR)
  - Design
    - Inventory
    - Operating
  - Legal
  - Permit
Modernization of Policy

• Design Rating
  • Highest level of conservatism
  • Use to ensure the bridge will stand the test of time

• Legal Rating
  • Use for posting considerations

• Permit Rating
  • Use for analyzing overweight loads
Modernization of Policy

Frequency of Ratings

When is a new load rating required?

- Whenever there is a change in condition
  - New Bridge
  - Rehabilitation
  - Deterioration/Critical Find
  - Damage
Modernization of Policy

What are the required load rating vehicles?

• Defined in Part 3 of the Bridge Inspection Manual
• Depends on the purpose of the load rating
  • Is it a brand new or proposed bridge?
  • Is there deterioration such that potential load restrictions need investigated?
• Vehicles are therefore grouped into classifications
  • Design
  • Legal
  • Permit
Modernization of Policy

What are the required load rating vehicles?

Design Vehicles

• New structures or rehabilitations
• Listed on the plans of the primary load carrying members

![Table of Truck Configurations]

*The Fatigue configuration shall be used for evaluating the Fatigue Limit State per MBE Table 6A.4.2.2-1 whenever HL-93 is specified on applicable plans.

Figure 3-4.1 Potential Design Vehicles
Modernization of Policy

What are the required load rating vehicles?

Legal Vehicles
- Required by state and/or federal law
- As a group represent typical “legal” truck configurations
- Use for determining the present day capacity of a bridge
- Use for determining load restrictions

<table>
<thead>
<tr>
<th>Truck Configuration</th>
<th>LRFR Subcategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-20</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>HS-20</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>Alternate Military</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>AASHTO Type 3</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>AASHTO Type 3S2</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>AASHTO Type 3-3</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>Lane-Type*</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>EV2</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>EV3</td>
<td>Routine Commercial Traffic</td>
</tr>
<tr>
<td>NRL**</td>
<td>Specialized Hauling</td>
</tr>
<tr>
<td>SU4</td>
<td>Specialized Hauling</td>
</tr>
<tr>
<td>SU5</td>
<td>Specialized Hauling</td>
</tr>
<tr>
<td>SU6</td>
<td>Specialized Hauling</td>
</tr>
<tr>
<td>SU7</td>
<td>Specialized Hauling</td>
</tr>
</tbody>
</table>

* Load and Resistance Factor Rating (LRFR) only
** Not to be used for load posting

Figure 3-4.2 Required Legal Vehicles
Modernization of Policy

What are the required load rating vehicles?

Permit Vehicles

• Use to consider passage for vehicles that exceed legal requirements
• Broken into two subcategories
  • Routine
    • Typically multi-trip annual permits
    • Use for determining the present day capacity of a bridge for applicable routes
    • Use for determining load restrictions for applicable routes
  • Special
    • Single trip or non-routine permit analysis

<table>
<thead>
<tr>
<th>Routine</th>
<th>Special</th>
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</thead>
<tbody>
<tr>
<td>Toll Road Loading No. 1</td>
<td>Superload – 11 Axles</td>
</tr>
<tr>
<td>Toll Road Loading No. 2</td>
<td>Superload – 13 Axles</td>
</tr>
<tr>
<td>Special Toll Road Truck</td>
<td>Superload – 14 Axles</td>
</tr>
<tr>
<td>Michigan Train Truck #5</td>
<td>Superload – 19 Axles (305K)</td>
</tr>
<tr>
<td>Michigan Train Truck #8</td>
<td>Superload – 19 Axles (480.09K)</td>
</tr>
</tbody>
</table>

Figure 3-4.3 Potential Permit Vehicles
Documentation/Submittal Process

• So what do we do with all of our documentation?
  • Create a load rating report in BIAS
    • Update load rating values
    • Attach supporting calculations to the report
  • Upload supporting documentation to the ERMS Bridge File
    • Calculations
    • Program Files

• See Part 3 of the Bridge Inspection Manual for additional detail
Documentation/Submittal Process

Creating a Load Rating Report in BIAS

• Open BIAS & navigate to your bridge
• In the upper right corner, click “Create Report”
Creating a Load Rating Report in BIAS

- Select the “Load Rating” report type
- Click “Create”
- Fill out the fields
Documentation/Submittal Process

Attaching supporting calculations to the report

• Click “Report Sections”
• Click “Add Section/PDF Attachments”
Documentation/Submittal Process

Attaching supporting calculations to the report

- Browse for your file
- Name it
- Click “Upload”
Documentation/Submittal Process

Attaching supporting calculations to the report

- Click on the wrench
- Click “Submit Report for Review”
- Click “Submit”
Documentation/Submittal Process

Uploading Load Rating Summary Reports & Program Files to the Bridge File (ERMS)

• From ITAP, request “Consultant” access to the bridge file
Documentation/Submittal Process

Uploading Load Rating Summary Reports & Program Files to the Bridge File (ERMS)

• The bridge file works similarly to design documents
• Use the Multiple File Upload Tool to import your files
Documentation/Submittal Process

Uploading Load Rating Summary Reports & Program Files to the Bridge File (ERMS)

• Be sure to fill out the following information for each file
  • Structure Number
  • Document Type
  • NBI Number
  • County

• Use the following two document types
  • Load Rating Summary
  • Load Rating Model
Documentation/Submittal Process

Uploading Load Rating Summary Reports & Program Files to the Bridge File (ERMS)

- When done, click “Add Files to ERMS”
- Close the browser when the confirmation screen appears
Documentation/Submittal Process

• BIAS doesn’t have enough fields to store all of this data

• Where do we store it?
  • BRADIN

• What is BRADIN?
  • The future home to all load rating data
  • Developed in-house and accessible from ITAP
  • Kept in sync with BIAS
  • Will eventually prepopulate the fields in the BIAS “LOAD RATING AND POSTING” section
# Bridge - Home

**Bridge Number:** 003-70-08768  
**NBI:** 000826

## Ratings

<table>
<thead>
<tr>
<th>Action</th>
<th>Rating Date</th>
<th>Submitted</th>
<th>Created Date</th>
<th>Revision Date</th>
<th>Submitted</th>
<th>Username</th>
<th>Rating (Rehab) Version</th>
<th>Deterior... Included</th>
<th>DES</th>
<th>Departmer... / Consultant</th>
<th>Rater Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10/13/2017</td>
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<td>10/13/2017</td>
<td>10/13/2017</td>
<td>A</td>
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<td></td>
<td></td>
<td></td>
<td>INDOT</td>
<td>Sean Hankins</td>
</tr>
<tr>
<td></td>
<td>08/05/2014</td>
<td>✓</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>INDOT</td>
<td>Sean Hankins</td>
</tr>
</tbody>
</table>
Documentation/Submittal Process

Future Load Rating Database

Bridge Number: 003-70-08768

New Rating

Rating Program
Program Version
Rating Date
10/13/2017
Department / Consultant
Rater Name

Rating Method
- LFR - Load Factor Rating
- LRFR - Load and Resistance Factor Rating
- Engineering Judgement

Rating (Rehab) Version

(41) Structure Open / Posted / Closed
- A - Open

(70) Bridge Posting
- 6 - EQUAL TO OR ABOVE LEGAL LK

(66A) Tons Posted

(66D) Date Posted / Closed

Toll Road
- Yes within 15 miles of gate
- No / not within 15 miles of gate

NBI: 000826

Extra Heavy Duty Highway
Plans Available
Shop Drawings Available
Legal & Routine Permit Loads
Special Permit Loads
### Future Load Rating Database

#### Legal & Routine Permit Loads

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Rating Factor</th>
<th>Load Capacity (tons)</th>
<th>Safe Posting Load (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emergency Vehicles</strong></td>
<td></td>
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</tr>
<tr>
<td>EV2 (23.75T)</td>
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</tr>
<tr>
<td>EV3 (43T)</td>
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<tr>
<td><strong>2 Axles</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>H20-44 (20 T)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternative Military (24 T)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3 Axles</strong></td>
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</tr>
<tr>
<td>H30-44 (36 T)</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Documentation/Submittal Process

• When will this be available?
  • State System ➔ November 2017
  • County System ➔ TBD

• How will the submittal process change?
  • Update values in BRADIN
  • Upload documentation to ERMS
  • BIAS... do nothing... it will update itself
Summary

• Wrap-Up
• Questions?