

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

Truck Configuration
HL-93
Fatigue*
H-20
HS-20
HS-25
Alternate Military
Toll Road Loading No. 1
Toll Road Loading No. 2
Special Toll Road Truck
Michigan Train Truck #5
Michigan Train Truck #8

* 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

Truck Configuration	LRFR Subcategory
H-20	Routine Commercial Traffic
HS-20	Routine Commercial Traffic
Alternate Military	Routine Commercial Traffic
AASHTO Type 3	Routine Commercial Traffic
AASHTO Type 3S2	Routine Commercial Traffic
AASHTO Type 3-3	Routine Commercial Traffic
Lane-Type*	Routine Commercial Traffic
EV2	Routine Commercial Traffic
EV3	Routine Commercial Traffic
NRL**	Specialized Hauling
SU4	Specialized Hauling
SU5	Specialized Hauling
SU6	Specialized Hauling
SU7	Specialized Hauling

* 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

Routine	Special
Toll Road Loading No. 1	Superload – 11 Axles
Toll Road Loading No. 2	Superload – 13 Axles
Special Toll Road Truck	Superload – 14 Axles
Michigan Train Truck #5	Superload – 19 Axles (305K)
Michigan Train Truck #8	Superload – 19 Axles (480.09K)

Figure 3-4.3 Potential Permit Vehicles

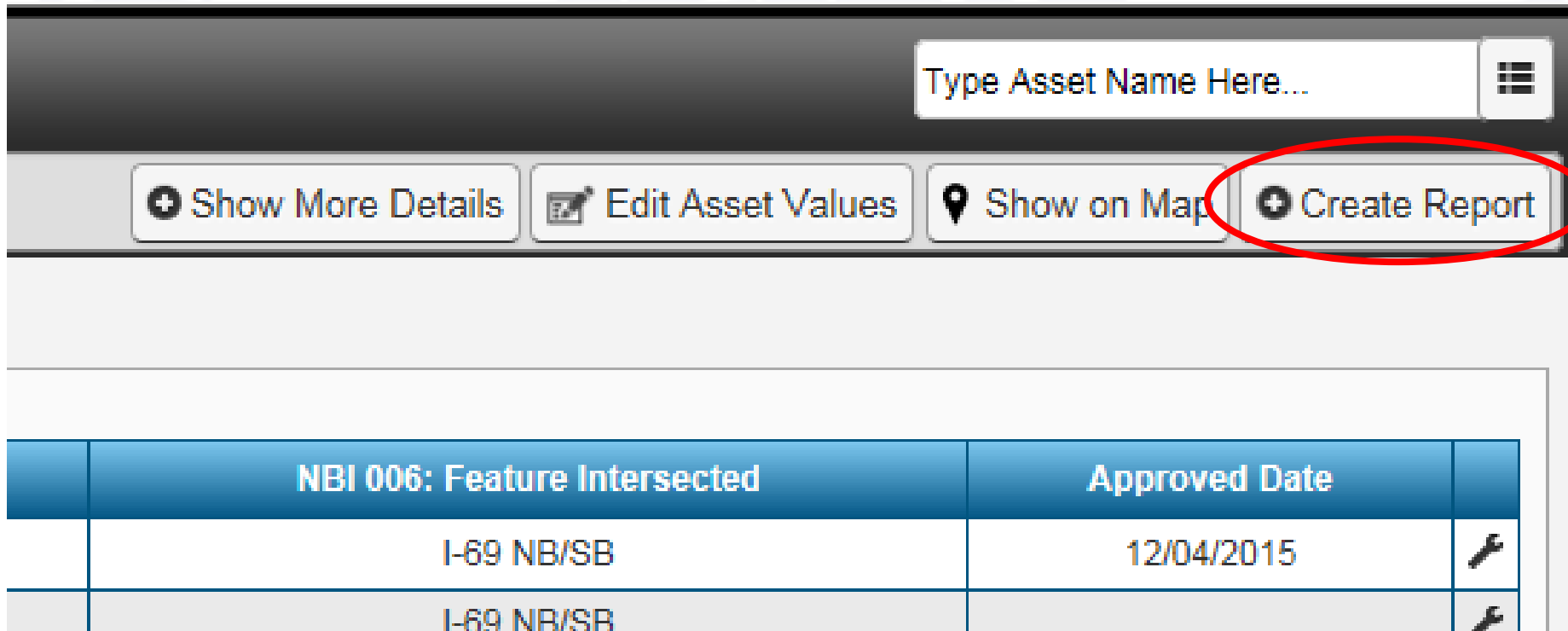
Documentation/Submittal Process

- 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”



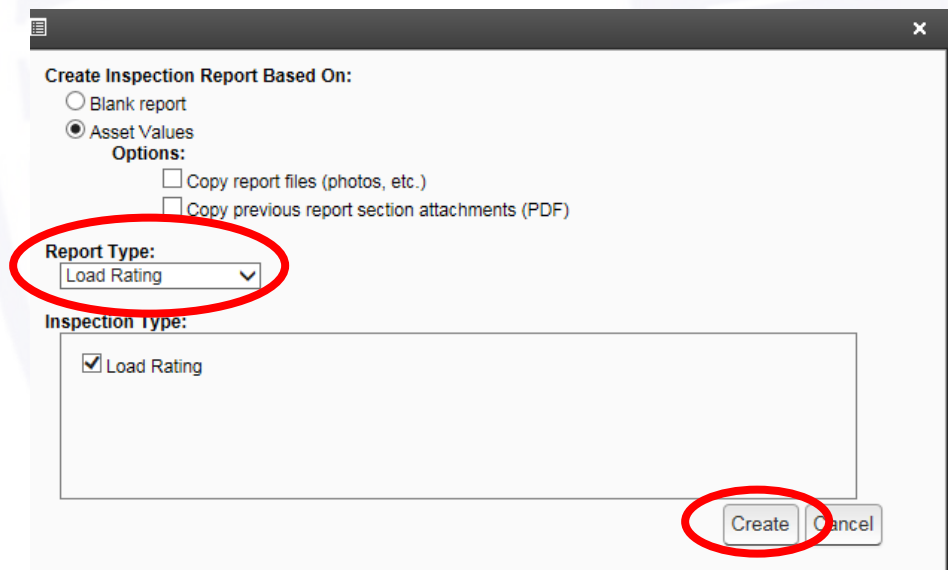
The screenshot displays the BIAS software interface. At the top, there is a search bar labeled "Type Asset Name Here..." with a menu icon to its right. Below the search bar is a row of four buttons: "Show More Details", "Edit Asset Values", "Show on Map", and "Create Report". The "Create Report" button is circled in red. Below the buttons is a table with two columns: "NBI 006: Feature Intersected" and "Approved Date". The table contains two rows of data.

NBI 006: Feature Intersected	Approved Date
I-69 NB/SB	12/04/2015
I-69 NB/SB	

Documentation/Submittal Process

Creating a Load Rating Report in BIAS

- Select the “Load Rating” report type
- Click “Create”
- Fill out the fields



Create Inspection Report Based On:

☐ Blank report

☒ Asset Values

Options:

☐ Copy report files (photos, etc.)

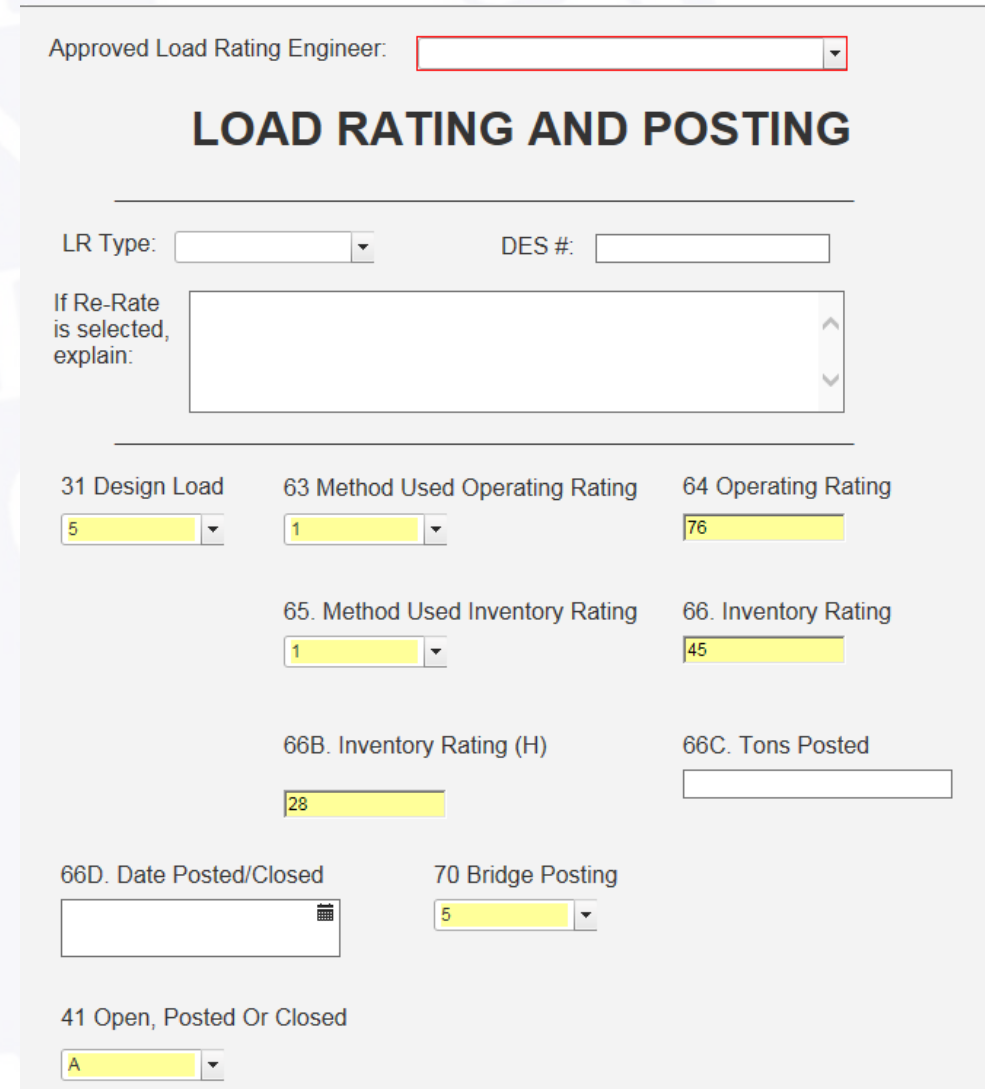
☐ Copy previous report section attachments (PDF)

Report Type: Load Rating

Inspection type:

☒ Load Rating

Create Cancel



Approved Load Rating Engineer:

LOAD RATING AND POSTING

LR Type: DES #:

If Re-Rate is selected, explain:

31 Design Load 5

63 Method Used Operating Rating 1

64 Operating Rating 76

65. Method Used Inventory Rating 1

66. Inventory Rating 45

66B. Inventory Rating (H) 28

66C. Tons Posted

66D. Date Posted/Closed

70 Bridge Posting 5

41 Open, Posted Or Closed A

Documentation/Submittal Process

Attaching supporting calculations to the report

- Click “Report Sections”
- Click “Add Section/PDF Attachments”

The screenshot displays a software interface for managing report sections. At the top, there are buttons for 'Save Order Changes', 'Add Sections/PDF Attachments', and 'View PDF'. Below these is a table with columns: 'Remove Section', 'Order', 'Section Name', 'Print', 'Include in Table of Contents', 'Insert Cover Page Before Section', and 'Show Page Number'. The table contains one row for 'Load Rating' with a 'View' link. Below the table, another set of buttons includes 'Save Order Changes', 'Add Sections/PDF Attachments' (circled in red), 'View PDF', and 'Email PDF'. On the right, a 'Forms' sidebar is visible with a list of options: 'Load Rating', 'Load Rating and Posting 2', 'Inspection Info', 'Report Sections' (circled in red), and 'Forms'. A toolbar at the top right shows various icons, including a red 'X' over a printer icon.

Remove Section	Order	Section Name	Print	Include in Table of Contents	Insert Cover Page Before Section	Show Page Number
	1	Load Rating	View	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Documentation/Submittal Process

Attaching supporting calculations to the report

- Browse for your file
- Name it
- Click “Upload”

▲ Add PDF Attachment

File: P:\Structural Services\Bridge Rehab and Load Rating **Browse...**

Name: Load Rating Summary Report

☒ Print

☐ Include in Table of Contents

☐ Insert Cover Page Before Section

☒ Show Page Number

☒ Show Footer

Upload

Save Order Changes Add Sections/PDF Attachments View PDF

Remove Section	Order	Section Name		Print	Include in Table of Contents	Insert Cover Page Before Section	Show Page Number	Edit Custom Section
	1	Load Rating	View	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	2	Load Rating Summary Report	View	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Edit

Save Order Changes Add Sections/PDF Attachments View PDF Email PDF

169-215-05323 A

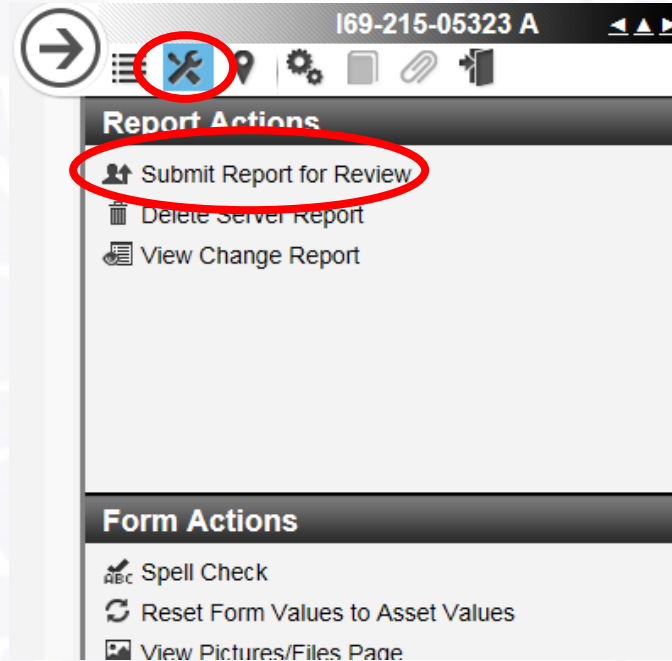
Forms

- Load Rating
 - Load Rating and Posting 2
 - Inspection Info
 - Report Sections**
 - Forms

Documentation/Submittal Process

Attaching supporting calculations to the report

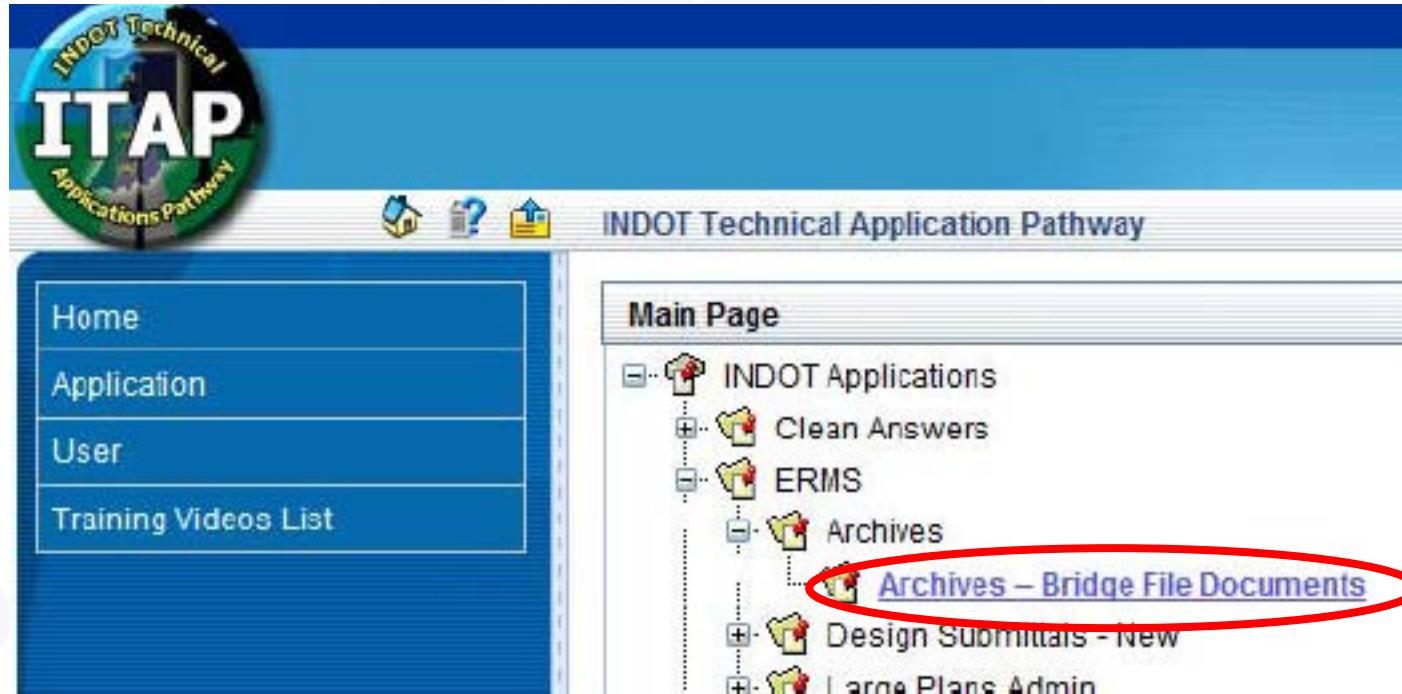
- Click on the wrench
- Click “Submit Report for Review
- Click “Submit”

This screenshot shows the 'Workflow Stage' and 'Comments' section of the application. The 'Workflow Stage' is set to 'Approve Final Report'. Below it is a large text area for 'Comments'. At the bottom left, the 'Submit' button is circled in red, next to a 'Close' button. The title bar at the top of this section reads 'I69-215-05323 A'.

Documentation/Submittal Process

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

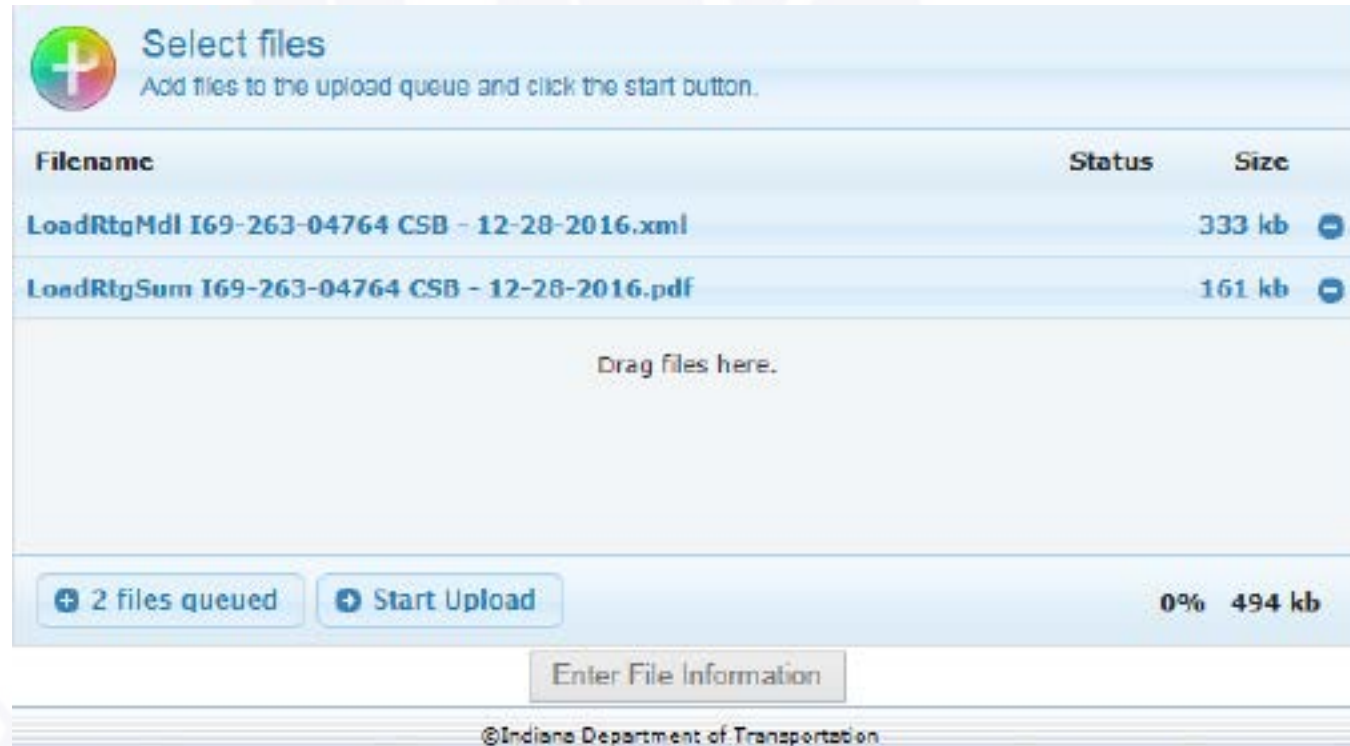
- From ITAP, request “Consultant” access to the bridge file



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



The screenshot displays a web-based file upload interface. At the top, a header bar contains a colorful circular icon with a plus sign and the text "Select files". Below this, a sub-header reads "Add files to the upload queue and click the start button." The main area features a table with three columns: "Filename", "Status", and "Size". Two files are listed in the table: "LoadRtgMdl I69-263-04764 CSB - 12-28-2016.xml" (333 kb) and "LoadRtgSum I69-263-04764 CSB - 12-28-2016.pdf" (161 kb). Below the table, a large light blue box contains the text "Drag files here." At the bottom of the interface, there is a status bar showing "2 files queued", a "Start Upload" button, and a progress indicator "0% 494 kb". A button labeled "Enter File Information" is positioned below the status bar. The footer of the page includes the text "©Indiana Department of Transportation" and the "NextLevel INDIANA" logo.

Filename	Status	Size
LoadRtgMdl I69-263-04764 CSB - 12-28-2016.xml		333 kb
LoadRtgSum I69-263-04764 CSB - 12-28-2016.pdf		161 kb

Drag files here.

2 files queued Start Upload 0% 494 kb

Enter File Information

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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

Enter DES number: [Fill from SPMS](#)

Required Properties

Document Type:

Structure Number: [Enter Values](#)

Optional Properties

NBI Number:

County:

Feature Intersected:

Document Date:

Year Built:

Facility Carried:

District:

[Next](#)

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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

Documentation/Submittal Process

Future Load Rating Database



Indiana Department of Transportation

Bridge Rating Application Database of
Indiana





Welcome Sean Hankins

Bridge - Home

Bridge Number: 003-70-08768

NBI: 000826

Ratings +


Action	Rating Date	Submitted	Created Date	Revision Date	Submitted	Username	Rating (Rehab) Version	Deterior... Included	DES	Departm... / Consultant	Rater Name
 	10/13/2017		10/13/2017				A		1234567	INDOT	Sean Hankins
 	08/05/2014	✓	10/13/2017		10/13/2017		Original	✓		INDOT	Sean Hankins

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1 - 2 of 2 items

Documentation/Submittal Process

Future Load Rating Database



Indiana Department of Transportation

Bridge Rating Application Database of Indiana

Welcome

Bridge Number: 003-70-08768

NBI: 000826

New Rating

Rating Program

Program Version

Rating Date



Department / Consultant

Rater Name

Rating Method

- ☒ LFR - Load Factor Rating
☐ LRFR - Load and Resistance Factor Rating
☐ Engineering Judgement

Rating (Rehab) Version

Contract

☐ Deterioration Included

DES

Project

(41) Structure Open / Posted / Closed

(70) Bridge Posting

(66C) Tons Posted

(66D) Date Posted / Closed



Toll Road

- ☐ Yes
☐ within 15 miles of gate
☒ No / not within 15 miles of gate

☐ Extra Heavy Duty Highway

☐ Plans Available

Shop Drawings Available

- ☐ Yes
☐ No
☒ N / A

Notes

BIAS

Design Inventory Loads

Legal & Routine Permit Loads

Special Permit Loads

Documentation/Submittal Process

Future Load Rating Database

BIAS

Design Inventory Loads

Legal & Routine Permit Loads

Special Permit Loads

Legal & Routine Permit Loads

Vehicle	Rating Factor	Load Capacity (tons)	Safe Posting Load (tons)
Emergency Vehicles			
EV2 (28.75T)	<div></div>		
EV3 (43T)	<div></div>		
		Single Axle	
		Tandem	
		Gross	

Vehicle	Rating Factor	Load Capacity (tons)	Safe Posting Load (tons)
NRL	<div></div>	N/A	N/A
2 Axles			
H20-44 (20 T)	<div></div>		
Alternative Military (24 T)	<div></div>		
3 Axles			
HS20-44 (36 T)	<div></div>		

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?

