

Louisiana Bridge Load Rating

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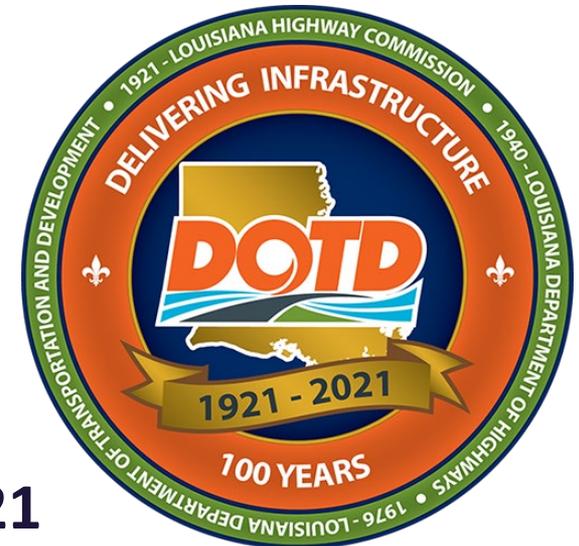
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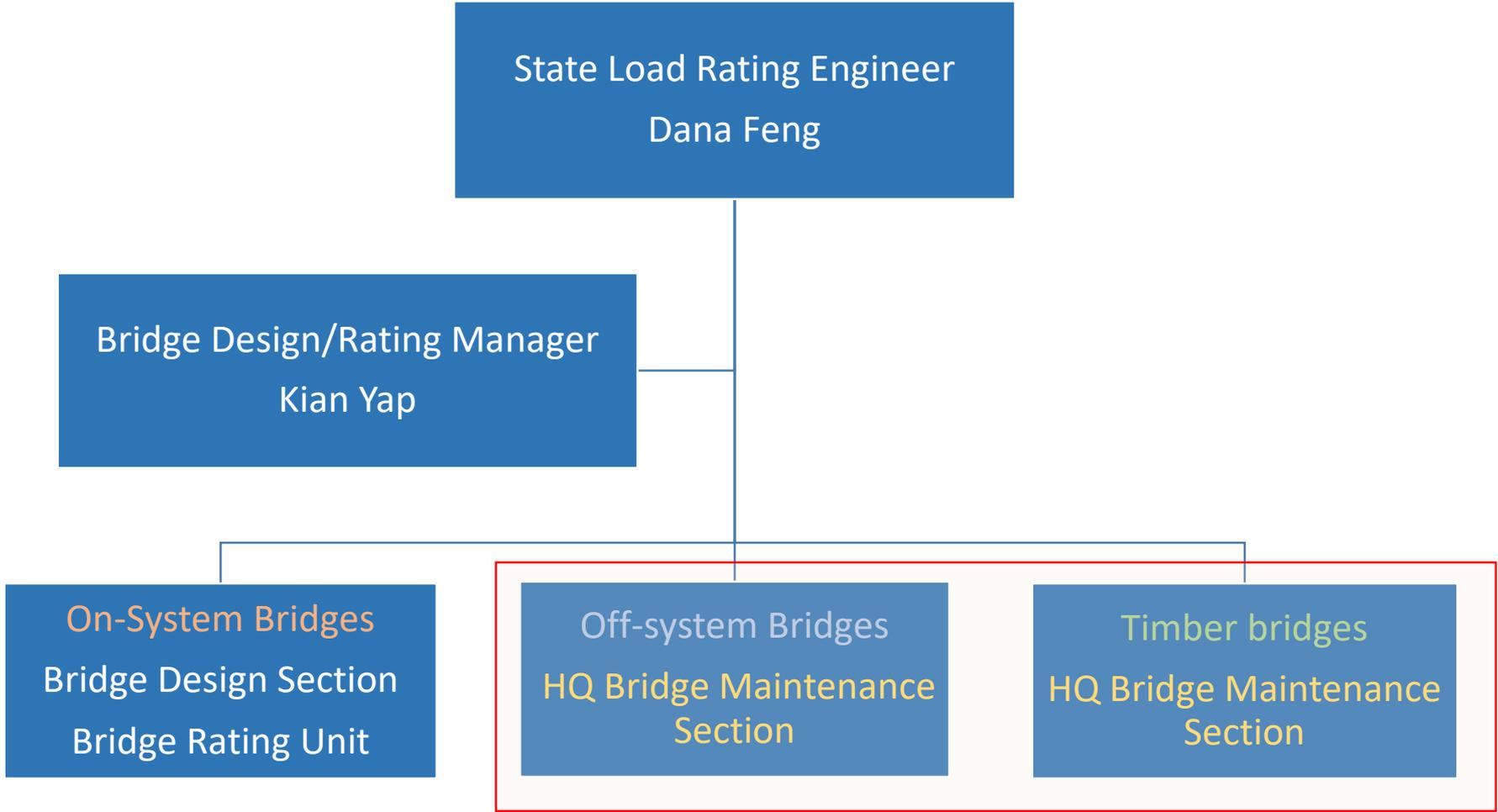
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LPESA Fall Conference 2021

LA DOTD Load Rating Program





Bridge Maintenance and Inspections

Documents and Manuals

Parts Of A Bridge

Timber Bridges

Movable Bridges

Archived Documents

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Bridge Maintenance and Inspections

There are nearly 13,000 bridges in Louisiana, approximately 7,900 state-owned and 5,000 locally owned. DOTD is responsible for performing inspections on all of these bridges at least every two years, or more frequently if deemed necessary.

During an inspection, DOTD's bridge inspectors examine various elements of a bridge such as the bridge's substructure (piers, columns, etc.), superstructure (girders, trusses, etc.) and decking (roadway surface, bridge rails, etc.).

DOTD's first priority is always safety, and we continue to inspect bridges around the state to make sure that they are safe for the public's use.

If there is a significant condition change, the frequency of inspection is increased; load limits posted and/or bridges are closed as appropriate.

If a bridge is deemed unsafe during an inspection, DOTD will close it until it can be repaired or replaced.

Since January 2008, over \$1.2 billion has been invested on 456 projects to repair and/or replace bridges in Louisiana.

*As of Sept. 8, 2014

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225-379-1329 BRIDGE INSPECTION ENGINEER

- Bridge Maintenance and Inspections
- Documents and Manuals**
- Parts Of A Bridge
- Timber Bridges
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- Archived Documents

Documents and Manuals

<input type="checkbox"/>	Type	Name	Modified	File Size
		2020 Ladotd Coding Guide	6/30/2020 9:06 AM	9618 KB
		Bridge Closure Form	7/22/2021 8:53 AM	41 KB
		InspecTech Inspection Form (Edited)	6/23/2016 1:11 PM	102 KB
		Louisiana Bridge Inspection Manual 5-29-2020	6/1/2020 3:16 PM	12756 KB
		Parts Of A Bridge	9/11/2014 9:17 AM	11 KB
		Structure Type Codes (06-06-18)	6/6/2018 3:52 PM	55 KB



2020 EDITION

BRIDGE INSPECTION MANUAL

LOUISIANA
DEPARTMENT OF
TRANSPORTATION
& DEVELOPMENT

CHAPTER 2. BRIDGE MANAGEMENT ORGANIZATION

2.1. AGENCIES

Collaboration with interagency partnerships is critical to ensuring a safe bridge structure is available for public use. Each bridge owner is responsible for performing a condition assessment and for filing that information in a timely manner to comply with federal legislation. 23 CFR 650.315(c) requires individual bridge data contained in the National Bridge Inventory (NBI) to accurately reflect the status of the bridge.



Following a change in status, DOTD is required to update each bridge file no later than 90 days for On-System bridges and 180 days for off-system bridges.

Examples of when status changes are needed for a bridge file are:

- Newly constructed bridges; once the bridge is inspected and before it is physically open to traffic the bridge file must be updated
- Any load restriction or bridge closure
- Modifications to the existing structure inventory and appraisal (SI&A) data

Only DOTD approved bridge inspection staff can implement status changes to a bridge file. Therefore, collaboration between bridge owners, Districts and Headquarters is imperative and effectively required by law. Examples of other reasons for collaboration efforts include:

- Change in bridge ownership
- Change in Team Leader status for a qualified bridge inspector
- Updating any SI&A bridge inventory data
- Requesting underwater bridge inspection services

Municipalities, parishes and private bridge owners will collaborate with their respective regional DOTD District Bridge Engineer. The Port of New Orleans, Greater New Orleans Expressway Commission, bordering states, toll authorities, and railroad companies will collaborate with the DOTD Headquarters Bridge Inspection Office.

All local agencies and bridge owners will report any bridge repair, rehabilitation, and/or replacements **with drawings** (to include any as-builts and revised load ratings) to the respective local DOTD District Bridge Engineer or Headquarters Bridge Inspection Office.

CHAPTER 3. BRIDGE RECORDS

FILE COMPONENT	DOTD RESPONSIBILITY	OFF-SYSTEM BRIDGE OWNER RESPONSIBILITY
<p>Special Inspection Procedures/ Requirements</p>	<p>Document unique procedures and requirements such as access and equipment needs, notification requirements or specialized technicians needed for routine, fracture critical, underwater and in-depth inspections</p>	<p>Ensure special procedures are followed as necessary at special/interim inspections.</p>
<p>Load Rating Documentation – Load Posting/Restrictions</p>	<ul style="list-style-type: none"> • Maintain load rating records for all bridge files: any posting/closure documentation, including plans, sketches, and calculations. • Load rate locally owned timber bridges and notify owners of results. 	<ul style="list-style-type: none"> • Maintain and provide load ratings per the procedures in Sections 7.10 and EDSM I.1.1.15. • Ensure that all new bridges being added to the DOTD inventory have an updated and valid load rating. • Apply load posting/restriction within 30 days from uploading load rating to AssetWise.

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

ENGINEERING DIRECTIVES AND STANDARDS

Volume	Chapter	Section	Directive Number	Effective Date
I	1	1	15	JUNE 14, 2021

SUBJECT: LOUISIANA BRIDGE LOAD RATING STANDARDS

1. **PURPOSE:** This directive establishes a policy for determining the live-load carrying capacity for all bridges.
2. **SCOPE:** This directive is applicable to all bridges located on public roads in the State of Louisiana.
3. **POLICY:** It is the policy of the Department that all public bridges carrying vehicular traffic in Louisiana be rated by an engineer at a frequency that will ensure an analysis that accurately reflects the current condition of the bridge. The frequency of rating/reviewing is dependent upon the National Bridge Inventory (NBI) structural condition ratings of the bridge as described in the latest bridge inspection reports or other conditions, as shown in Table 1.
4. **PROCEDURE:** Bridges will be structurally evaluated according to the AASHTO Manual for Bridge Evaluation.

Structural Conditions**Rating/Review Frequency**

Lowest NBI
Structural Condition
Rating

Rating 0, 1

After corrective action is taken and before opening to traffic, and upon notification from Bridge Maintenance Section or District Bridge Engineers.

Rating 2, 3, 4

1. Upon notification of structural condition rating drop from Bridge Maintenance Section or District Bridge Engineers,
2. Or every four (4) years

Rating 5, 6

1. Upon notification of structural condition rating drop from Bridge Maintenance Section or District Bridge Engineers,
2. Or every eight (8) years

Rating 7, 8, 9

Upon request from Bridge Maintenance Section or District Bridge Engineers

Other Conditions	No rating	Upon request from Bridge Maintenance Section or District Bridge Engineers
	Element Condition State (CS) 4	Upon notification of routine, in-depth, underwater, or fracture critical inspection type review from Bridge Maintenance Section or District Bridge Engineers
	As-Design Rating	As part of bridge design tasks
	As-Built Rating	Construction field changes (as reflected on as-built drawing) as part of a construction project and upon request from Project Managers or District Bridge Engineers
	Bridge Damage	Upon notification of structural damage from Bridge Maintenance Section or District Bridge Engineers
	Overlay	As part of the design project and upon request from Project Managers and District Bridge Engineers

Other Conditions	Overlay	As part of the design project and upon request from Project Managers and District Bridge Engineers
	Structural Rehabilitation Project	As part of the design project and upon request from Project Managers, Bridge Maintenance Section or District Bridge Engineers
	Structural Maintenance	As part of the work order and upon request from Bridge Maintenance Section or District Bridge Engineers. A new load rating analysis might be required when maintenance or improvement work, change in the strength of members, damaged primary member, or dead load has altered the condition or capacity of the structure.
	Timber Structure	<ol style="list-style-type: none"> 1. Upon finding significant changes 2. Or every four (4) years

Table 1: Structural Conditions and Rating/Review Frequency

FHWA 23 Metrics

- Metrics for the Oversight of the National Bridge Inspection Program
 - Metric #13: Inspection procedures - Load Rating
 - Metric #14: Inspection procedures - Post or Restrict
 - Metric #15: Bridge Files

114 Bridges are currently have no loading rating reports or have incomplete load rating documents.

- 68 are under DOTD consultants contract(s)
 - 37 are in progress or subject to advance analysis / load test
 - 31 are rated pending DOTD decision
- 2 new bridges are pending on receiving of load rating package from owner.
- 44 to be provided by bridge owner per 2019 PCA returns
 - 8 Parishes

Definitions

- Load rating is the determination of the live load capacity of a bridge
- Based on
 - As-built plans
 - Bridge structural conditions: latest inspection

Purpose of Load Rating

- Ensure bridge safety
- Comply with federal regulation
- Rehabilitation/replacement
- Load posting
- Process overload permit



Qualifications and Responsibilities

- A LA licensed professional civil engineer
- LRFD/LRFR knowledge
- QA/QC



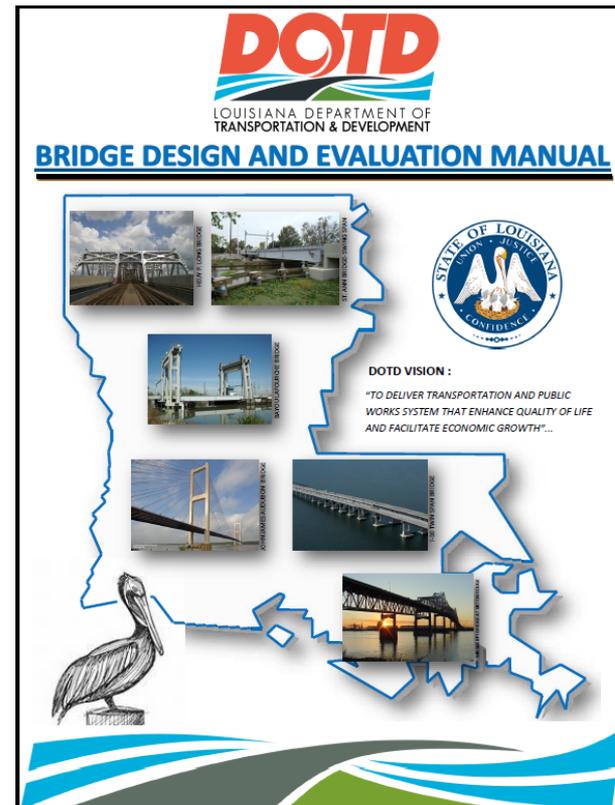
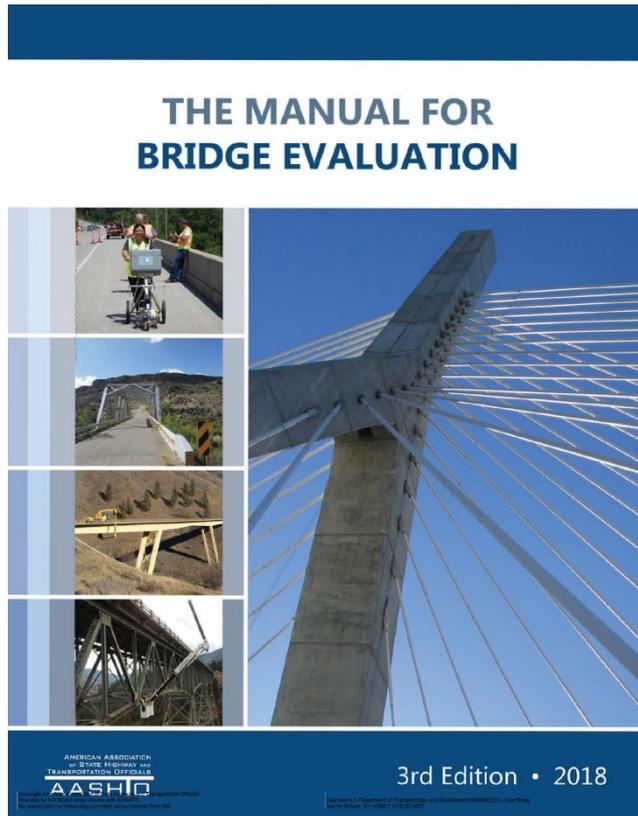
When

- New Bridges
 - Within 90 days of opening to traffic (180 days for Off-system)
 - As-design rating is part of the design plan
 - As-built rating: Any alteration to contracted construction plans. Same as As-design rating if no alteration to contracted construction plans.
- Existing Bridges
 - Structural conditions drop to 6 and below (EDSM I.1.1.15)
 - When bridge condition changes: live load, dead load (overlay), physical condition (deterioration, rehabilitation, re-decking, damages) and Specifications
 - As requested

Guidance & Regulations

- FHWA:
 - Legislation
 - Regulation: 23 CFR 650
 - Policy
 - Guidance: SHV, gusset plates, etc.
 - Assigned load rating
- AASHTO
 - Manual of Bridge Evaluation (MBE)
 - AASHTO LRFD
- LADOTD Bridge Design and Evaluation Manual (BDEM)
- LADOTD EDSM – Engineering Directives and Standard Manual (EDSM I.1.1.15, I.1.1.8, IV 4.1.2)
- Bridge Maintenance Directives

AASHTO MBE and LA DOTD BDEM



Assigned load rating

- The bridge was designed and checked using either the AASHTO Load and Resistance Factor Design (LRFD) or Load Factor Design (LFD) methods to at least HL-93 or HS-20 live loads, respectively; and
- The bridge was built in accordance with the design plans; and
- No changes to the loading conditions or the structure condition have occurred that could reduce the inventory rating below the design load level; and
- An evaluation has been completed and documented, determining that the force effects from State legal loads or permit loads do not exceed those from the design load; and
- The checked design calculations, and relevant computer input and output information, must be accessible and referenced or included in the individual bridge records.

FHWA memorandum

Date: September 29, 2011

Refer to: HIBT-30

Load rating of specialized hauling vehicles (SHV)

- FHWA Memo Date: November 13, 2013
- NCHRP Project 12-63 (Report 575, 2007): SU4, SU5, SU6 and SU7
- Due: July 1st, 2019



Emergency Vehicle Rating

- FHWA Memorandum: Load Rating for the FAST Act's Emergency Vehicles, dated April 19, 2017

- EV:



- Posting
- Due: December 31, 2022

Overload / Superload



Partial Load Rating Summary Sheet

Vehicle Type	GVW (kips)	Superstructure/Deck/Culvert				Substr	
		Rating Factor	Posting Weight (tons)	Controlling Member	Controlling Load Effect	Rating Factor	Posting Weight (tons)
HL-93 (INV)	N/A	0.77		Ext. Panel w/ SW	Flexure	0.65	
HL-93 (OPR)	N/A	0.99		Ext. Panel w/ SW	Flexure	0.94	
LADV-11(INV)	N/A						
LA Type 3	41.0	1.68	44.0	Ext. Panel w/ SW	Flexure	1.82	44.0
LA Type 3S2	73.0	1.50	54.9	Ext. Panel w/ SW	Flexure	1.35	49.4
Type 3-3	80.0	2.37	94.7	Ext. Panel w/ SW	Flexure	2.28	91.4
LA Type 6	80.0	1.49	59.7	Ext. Panel w/ SW	Flexure	1.62	64.6
LA Type 8	88.0	1.51	66.4	Ext. Panel w/ SW	Flexure	1.59	69.7
SU4	54.0	1.37	44.0	Ext. Panel w/ SW	Flexure	1.54	44.0
SU5	62.0	1.47	45.5	Ext. Panel w/ SW	Flexure	1.47	45.6
SU6	69.5	1.38	47.9	Ext. Panel w/ SW	Flexure	1.34	46.6
SU7	77.5	1.38	53.4	Ext. Panel w/ SW	Flexure	1.26	48.9
Lane-Type I	N/A						
Lane Type II	N/A						
EV2	57.5	1.65	47.3*	Ext. Panel w/ SW	Flexure	1.34	44.0*
EV3	86.0	1.08	46.6*	Ext. Panel w/ SW	Flexure	0.99	42.6*

* Informational purposes only

Posting Analysis Summary

	PV-Single	PV-Comb
Superstructure	44	54
Substructure	44	49
Recommended Posting Load	No Limit	
As-Design Rating	<input type="checkbox"/>	



QUESTIONS

