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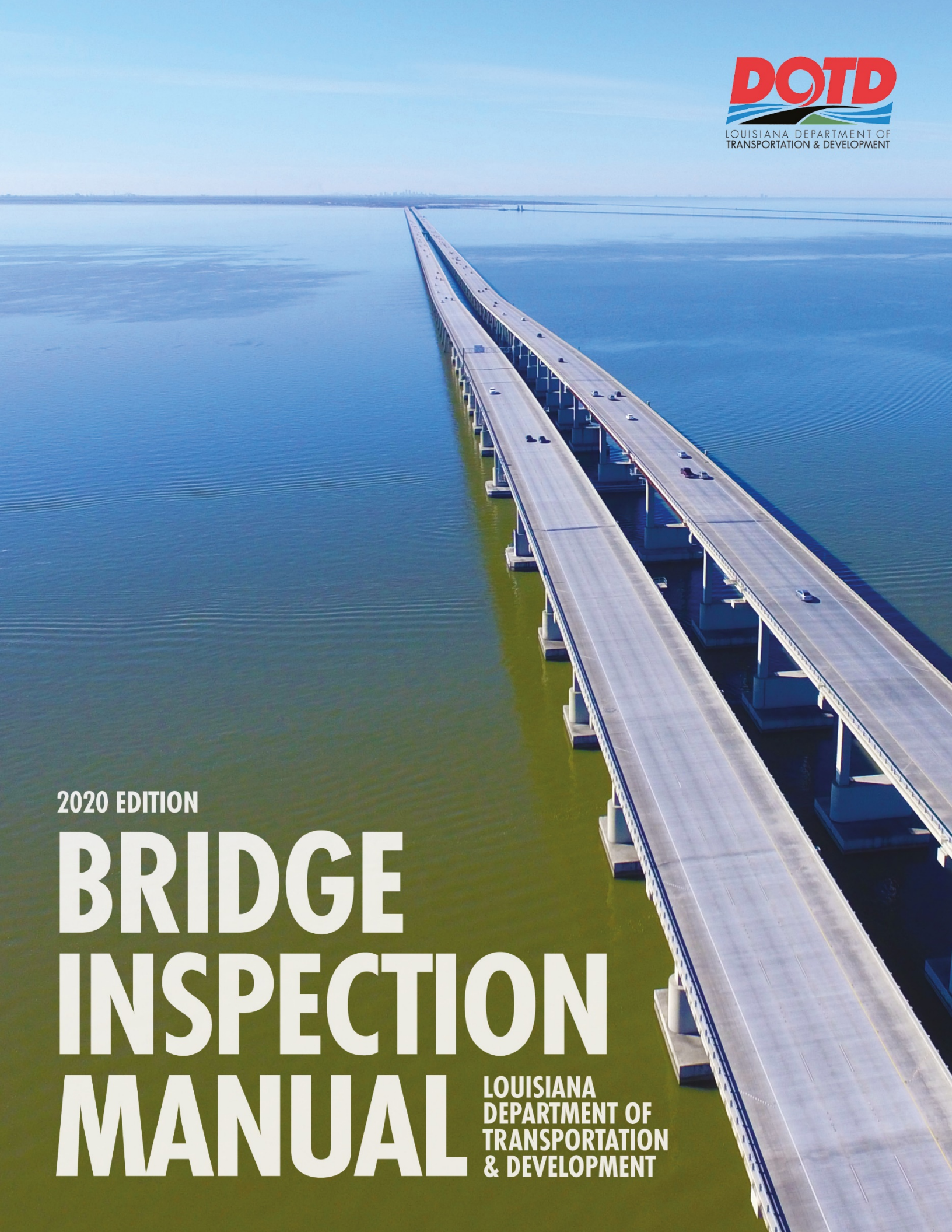

2020 EDITION

BRIDGE INSPECTION MANUAL

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

Louisiana Department of Transportation and Development

Section 51 – Bridge Maintenance

Bridge Inspection Manual

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Prepared by

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LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

FOREWORD

The safety of the traveling public is the ultimate purpose for all efforts toward an effective bridge management program, and specifically for this Bridge Inspection Manual. The State of Louisiana requires the comprehensive inspection of all bridges that carry public traffic and are publicly owned, operated, or maintained as defined under Louisiana Revised Statute 48:35 and as required by ***23 CFR 650.301*** of the *NBIS* and the *AASHTO MBE*. As per Section 1111 of the Moving Ahead for Progress in the 21st Century Act (MAP-21) modified 23 U.S.C. 144, each state is required to report bridge element level data to the Secretary of FHWA for all highway bridges on the National Highway System (NHS).

The intent behind the development of this document was to provide a sequential and intuitive manual for expeditious referencing of key procedures. Consistency is vital to an effective bridge management program. Program consistency among intergovernmental agencies, the bridge engineering community, and bridge owners will help to achieve the goals of this manual.

This manual replaces the following documents:

- The 13 Maintenance Directives
- Any technical memos regarding bridge inspection
- *2018 LADOTD Off-System Bridge Guidelines and Compliance Review Process*
- *2013 Bridge Inspection QC/QA Manual, 2nd Edition*
- DOTD *Pontis Bridge Inspection Manual*

This manual complements the following documents:

- LADOTD *2017 Recording and Coding Guide*
- LADOTD *Policies and Guidelines for Bridge Rating and Evaluation*
- FHWA *23 Metrics for the Oversight of the NBIP*
- FHWA *Bridge Inspector's Reference Manual*
- FHWA *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*
- FHWA *Federal Aid Off-System Highway Bridge Program Guidelines*
- All relevant EDSMs and other references outlined in Section 9 of this document

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Bridge Maintenance Administrator

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This initial edition of the Bridge Inspection Manual is the result of an ongoing, collective effort of many people in the Louisiana Department of Transportation and Development (DOTD) bridge inspection community. The DOTD Bridge Maintenance Department provided oversight for Moffatt & Nichol during development of this manual according to federal and state inspection policy, standards, directives, memos, and other documents. Technical comments provided by the bridge engineering community were an integral step in creating this initial version of the DOTD Bridge Inspection Manual.

Thanks to the many individuals who provided comments and feedback throughout the development process. Special thanks to the following individuals for their direct involvement and dedication to the technical development and editorial feedback:

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TABLE OF CONTENTS

FOREWORD ..... **III**

ACKNOWLEDGMENTS ..... **IV**

TABLE OF CONTENTS ..... **V**

LIST OF FIGURES ..... **VII**

LIST OF TABLES ..... **VIII**

CHAPTER 1. INTRODUCTION **2**

1.1. OBJECTIVE 2
1.2. ACRONYMS 2
1.3. PROGRAM OVERVIEW 3
1.4. COMPLIANCE 3
1.5. POLICY 3

CHAPTER 2. BRIDGE MANAGEMENT ORGANIZATION **6**

2.1. AGENCIES 6
2.2. CONTACT LISTS 6
2.3. ORGANIZATION CHART 7
2.4. CONSULTANTS 8

CHAPTER 3. BRIDGE RECORDS **10**

3.1. ASSETWISE SUMMARY 10
3.2. BRIDGE FILE CONTENT 10
3.3. UPDATING BRIDGE DATA 14
3.4. CLASSIFYING DOTD BRIDGES 19
3.5. FHWA DEFINITIONS 20
3.6. STRUCTURE NUMBERING 22

CHAPTER 4. SAFETY PRACTICES **24**

4.1. INTRODUCTION 24
4.2. JOB SAFETY ANALYSIS 24
4.3. PERSONNEL PROTECTIVE EQUIPMENT 25
4.4. VEHICULAR EQUIPMENT 25
4.5. FALL PROTECTION 25
4.6. AERIAL LIFTS 26
4.7. CONFINED SPACE 26
4.8. WORK ZONE TRAFFIC CONTROLS 27
4.9. CONSTRUCTION ZONES 27
4.10. WILDLIFE PRECAUTIONS 27
4.11. WORKING ALONE 28
4.12. EMERGENCY PROCEDURES 28
4.13. REFERENCES 29

CHAPTER 5. BRIDGE INSPECTION PROCEDURES **31**

5.1. PERSONNEL QUALIFICATIONS 31
5.2. PERSONNEL RESPONSIBILITIES 34
5.3. DOCUMENTATION 36
5.4. INSPECTION TYPES AND FREQUENCIES 37
5.5. ELEMENT LEVEL DATA COLLECTION 50

5.6. Condition States & Associated Defects 52
5.7. Overlapping Defects 52
5.8. SI&A and Non-SI&A Field Coding 53
5.9. Delayed Inspections 53
5.10. Safety Features 54
5.11. Timber Elements 55
5.12. Gusset Plates 55
5.13. Streambed Field Documentation 56
5.14. Monitoring Scour and Plan of Actions 57
5.15. Bridge Posting 58
5.16. Collection of Data for Load Ratings 63
5.17. Critical Findings 64
5.18. Bridge Closure Procedures 66
CHAPTER 6. UNIQUE CASES 69
6.1. Repair Documentation 69
6.2. Railroads 70
6.3. Ramp Bridges 70
6.4. Border Bridges 71
6.5. Movable Bridges 71
6.6. Cable-Supported Bridges 81
6.7. Post-Tensioned Tendon Elements 82
6.8. Material Testing 82
6.9. Access and Technology 82
CHAPTER 7. REPORTING PROCEDURES 87
7.1. AASHTO Elements 87
7.2. SI&A and Non-SI&A Coding Guidance 88
7.3. AssetWise Overview 88
7.4. Critical Finding Follow-Up 89
7.5. Work Requests 90
7.6. Delay Documentation 91
7.7. Fracture Critical Documentation 91
7.8. Bridge Rehab Documentation 93
7.9. Scour Evaluation 93
7.10. Load Rating 94
7.11. Timber Bridge Rating 95
7.12. Posting 96
7.13. Signing and Sealing 97
CHAPTER 8. QUALITY CONTROL / QUALITY ASSURANCE 99
8.1. Program Overview 99
8.2. Definitions 100
8.3. Quality Program 100
8.4. Systematic Documentation of On-System Compliance 103
8.5. Off-System District Compliance 104
CHAPTER 9. REFERENCES 109
9.1. Primary Standards, Manuals, and Technical Advisories 109
9.2. Peripheral Standards, Manuals, and Technical Advisories 110
CHAPTER 10. APPENDICES 113

LIST OF FIGURES

Figure 2-1: Organization Chart 7
Figure 5-1: CMP Culvert. Source: Engineering Operations. 40
Figure 5-2: Guidelines for Measuring Culverts 40
Figure 5-2: Culvert Inspections 41
Figure 5-3: UT on Steel Pile. Source: Engineering Operations 50
Figure 5-4: Inventory Direction Example 52
Figure 5-5: Bridge Posting Location Diagram 61
Figure 5-6: Bridge Posting Location Diagram 62
Figure 6-1: Ramp Bridges 71
Figure 6-2: Movable Bridges Statewide 72
Figure 6-3: Pontoon Bridge 73
Figure 6-4: Steel High Truss Swing Span. Source: Moffatt & Nichol, LADOTD 74
Figure 6-5: Steel Low Truss Swing Span 75
Figure 6-6: Steel Plate Girder Swing Span 76
Figure 6-7: Steel I-Beam Swing Span 77
Figure 6-8: Steel Truss Bascule Span 78
Figure 6-9: Steel Plate Girder Bascule Span. Source: Moffatt & Nichol, LADOTD 79
Figure 6-10: Steel Tower Vertical Lift Span. Source: Moffatt & Nichol, LADOTD 80
Figure 6-11: Steel Tower Vertical Lift Span. Source: Moffatt & Nichol, LADOTD 81
Figure 6-12: Bridge Inspection with Rope Access. Source: Engineering Operations, CDOT 84
Figure 6-13: Underwater Acoustic Imaging. Source: Moffatt & Nichol, LADOTD 85
Figure 8-1: "Field" Review of Bridge Inspection 99
Figure 8-2: QC vs. QA Venn Diagram 100

LIST OF TABLES

TABLE 3-1: BRIDGE FILE MAINTENANCE RESPONSIBILITIES FOR OFF-SYSTEM BRIDGES....12
TABLE 5-1: CONDITIONS FOR INCREASING FREQUENCY OF ROUTINE INSPECTIONS....39
TABLE 5-2: CONDITIONS FOR INCREASING FREQUENCY OF UNDERWATER INSPECTIONS....44
TABLE 5-3: CONDITIONS FOR INCREASING FREQUENCY OF SPECIAL INSPECTIONS....45
TABLE 5-5: CONDITIONS FOR INCREASING FREQUENCY OF FRACTURE CRITICAL INSPECTIONS....49
TABLE 5-6: BRIDGES REQUIRING POSTING....60
TABLE 8-1: OFF-SYSTEM COMPLIANCE DUE DATES....105
TABLE 8-2: COMPLIANCE CONDITIONS AND LEVELS....106

CHAPTER 1:
INTRODUCTION

CHAPTER 1. INTRODUCTION

1.1. OBJECTIVE

This manual describes the DOTD's organization, administration, and operational procedures of the State of Louisiana Bridge Inspection Program. It provides for a systematic approach to the inspection of any bridge structure on, under, or over public highways and streets in the interest of public safety and the protection of public investment.

1.2. ACRONYMS

The following is an alphabetically ordered list of acronyms used in this manual:

AASHTO	American Association of State Highway and Transportation Officials
ADE	Agency Defined Elements
ADT	Average Daily Traffic
ASCE	American Society of Civil Engineers
BDEM	Bridge Design and Evaluation Manual
BIRM	Bridge Inspector's Reference Manual
BME	Bridge Management Elements
CEO	Chief Engineer Order
CFR	Code of Federal Regulations
DOTD	Louisiana Department of Transportation and Development
EDSM	Engineering Directives and Standards Manual
ELDC	Element-Level Data Collections
FAA	Federal Aviation Administration
FC	Fracture Critical
FCM	Fracture Critical Member (same as Nonredundant Steel Tension Member)
FHWA	Federal Highway Administration
FRP	Fiber-Reinforced Polymers
GPR	Ground Penetrating Radar
HEC	Hydraulic Engineering Circulars
HQ	Headquarters Bridge Inspection Office
IDLH	Immediately Dangerous to Life and Health
JSA	Job Safety Analysis
MBE	AASHTO Manual for Bridge Evaluation
MMS	Maintenance Management System
MOT	Maintenance of Traffic
MSF	Master Structure File
NBE	National Bridge Elements
NBI	National Bridge Inventory
NBIS	National Bridge Inventory Standards
NBIP	National Bridge Inspection Program
NDE	Nondestructive Evaluation
NDT	Nondestructive Testing

NHI	National Highway Institute
NHS	National Highway System
NICET	National Certification in Engineering Technologies
NSTM	Nonredundant Steel Tension Member (same as FCM)
OSHA	Occupational Safety and Health Administration
PCA	Plan of Corrective Action
POA	Plan of Action
PPE	Personnel Protective Equipment
QA/QC	Quality Assurance/Quality Control
SI&A	Structure Inventory and Appraisal
STRM	Structure Inventory Database
UAI	Underwater Acoustic Imaging
UAS	Unmanned Aerial System
UBI	Under Bridge Inspection
UBIV	Under Bridge Inspection Vehicles
UT	Ultrasonic Testing
UWI	Underwater Inspection

1.3. Program Overview

Bridge inspection is one of the most important roles that DOTD must provide to the state of Louisiana to ensure that a safe public highway system is available to the traveling public. There are 12,625 bridges in Louisiana, 7,853 state-owned and 4,772 locally owned (Source: 2019 inventory). DOTD is responsible for inspecting, or causing to be inspected, all highway bridges located on public roads that are fully or partially located within the State's boundaries, except for bridges that are owned by Federal agencies.

1.4. Compliance

The State of Louisiana is reviewed annually on its adherence to the National Bridge Inspection Standards (NBIS), outlined in 23 the Code of Federal Regulations (CFR) 650 Subpart C (refer to Section 9). During this compliance review process, the Federal Highway Administration (FHWA) considers 23 focus area references as "metrics" to assess Louisiana's Bridge Inspection Program, determine the level of compliance met for each metric, and issue recommendations or suggested requirements to improve the compliance level. DOTD will consider the recommendations for improvement and develop either an improvement plan (IP) or a plan of corrective action (PCA) with target completion dates of included plan activities.

1.5. Policy

This Bridge Inspection Manual complements established federal codes, manuals, and guidelines. This manual does not replace the applicability of federal regulations. Furthermore, useful information for structure safety inspection personnel is also found in other federal, state, and independent manuals. This manual does not, nor can it, describe procedures for every conceivable situation that may arise. The intention of this manual is not to eliminate the need for individual engineering judgment and initiative,

but rather to provide the user with sufficient information so that training and experience may be better applied to routine and unusual problems encountered within the framework of these procedures.

This manual has been prepared in accordance with all relative DOTD policies and procedures and the NBIS, which are defined in 23 CFR, Part 650 Subpart C. Title 23 United States Code 144 directs States to inventory and inspect the highway bridges. In accordance with Title 23 United States Code 144(d)(2), state agencies will report bridge inspection element level data for all highway bridges on the National Highway System (NHS) to the Secretary of Transportation. State agencies have the option of performing element level inspections for a portion (as required by the federal regulations) or the entire inventory; DOTD policy is to perform all inspections at an element level.

Bridge inspection personnel at all levels of government, and contracted by the government, have the primary responsibility to provide adequate levels of inspection service for structures under their respective jurisdiction, as outlined in the federal regulations and as adopted by the American Association of State Highway and Transportation Officials (AASHTO). Bridge inspection personnel should become familiar with this manual and conduct bridge inspection program operations within the requirements and recommendations contained herein.

CHAPTER 2:
BRIDGE MANAGEMENT ORGANIZATION

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.

2.2. CONTACT LISTS

Contact information for bridge inspection, bridge maintenance, district offices and load rating can be found at http://wwwsp.dotd.la.gov/Inside_LaDOTD/Pages/Contact_Us.aspx.

2.3. Organization Chart

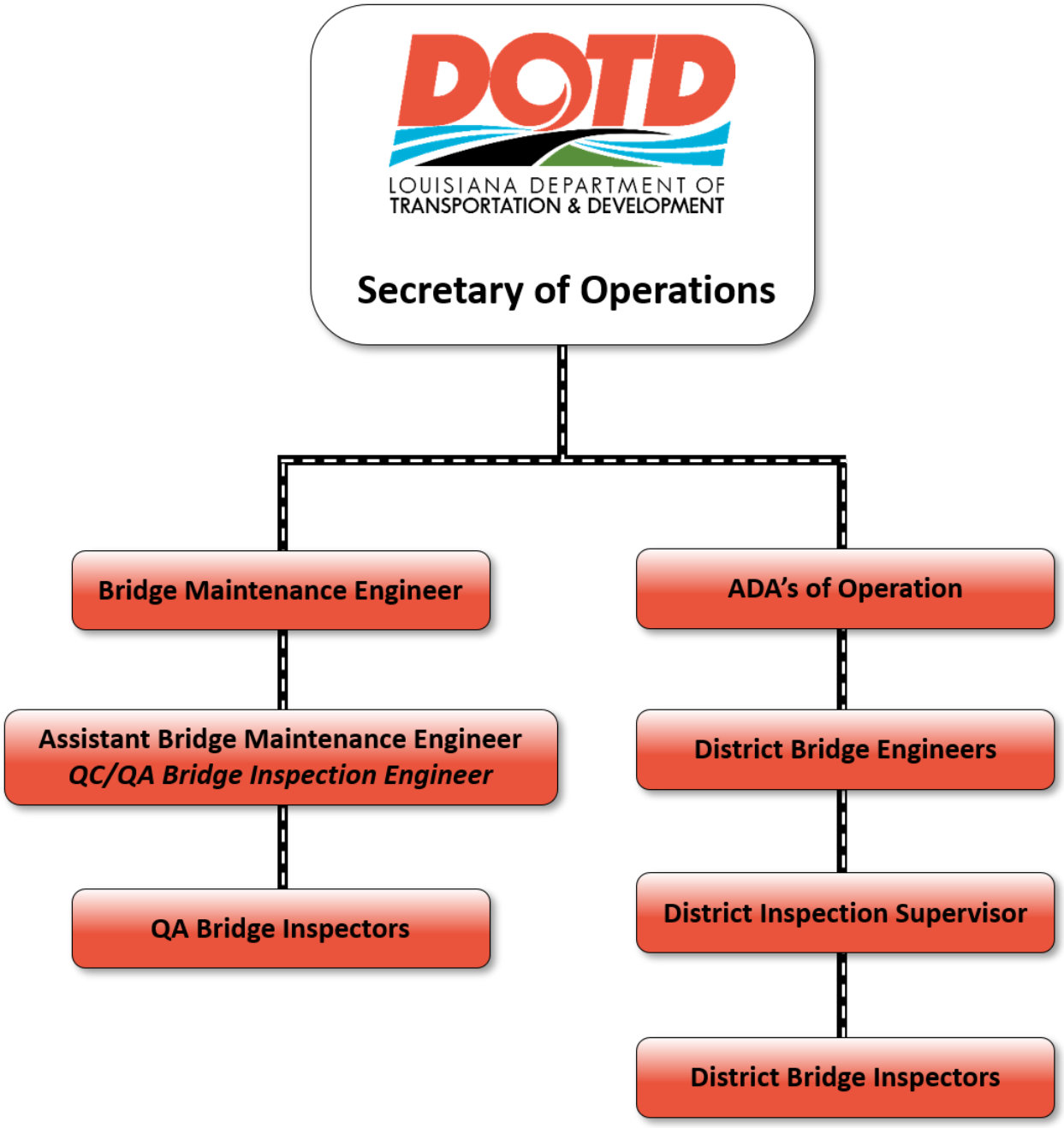


Figure 2-1: Organization Chart

2.4. CONSULTANTS

DOTD will seek out professional engineering services from consultants to fully complete and legally comply with the Louisiana State Bridge Inspection Program. The following is a list of previously advertised projects related to the Bridge Inspection Program:

- Bridge or Tunnel Inspection and Rehabilitation
- In-Depth Inspection for Complex Bridges and Tunnels
- Underwater Bridge Inspection
- Ancillary Inspection
- Nondestructive Evaluation of Structures

Consultants will operate to the same standards as the DOTD to meet the minimum requirements of the NBIS. All consultants will comply with the *Consultant Contract Services Manual* located on the DOTD website: http://bit.ly/DOTDCCS.

All bridge inspection consultants under contract with the DOTD will meet the minimum qualification requirements of the NBIS, this Manual and any project specific requirements stated in the Request for Proposal (RFP) and the contract. All Project Managers and qualified Team Leaders will ensure their team is fully equipped to perform NBIS bridge inspections in accordance with the FHWA *Bridge Inspector's Reference Manual (BIRM), specifically Section 2.4* (see Chapter 9).

DOTD area engineers, maintenance superintendents, and project engineers may notify consultants or contractor to:

- Arrange for initial inspections,
- Provide information for bridge inspection files, such as soil borings and pile driving data,
- Remove all vegetative growth or drift within proximity of the bridge, and
- Remove debris affecting drainage off the bridge deck.

CHAPTER 3:
BRIDGE RECORDS

CHAPTER 3. BRIDGE RECORDS

The State of Louisiana has implemented a Bridge Inspection Program to protect the traveling public. Bridge condition data is collected and assessed through the AssetWise electronic database that stores records relevant to the maintenance and management of each bridge structure. The primary responsibilities of Louisiana's Bridge Inspection Program are as follows:

- Maintain public safety
- Protect public investment
- Provide accurate bridge records
- Satisfy legal responsibilities for federal regulation
- Maintain historical and current bridge condition ratings (core and element level conditions)

Bridge records for all state owned, locally owned and any other inventoried bridge structure are maintained by the Headquarters Bridge Inspection Office. Bridge records are also required to be kept by the bridge owners for their respective structures. Bridge records are maintained in accordance with Section 2 of the AASHTO Manual for Bridge Evaluation per 23 CFR, Part 650.315 (refer to Section 9) and monitored in accordance with FHWA Metric #15.

3.1. AssetWise Summary

AssetWise (formerly known as InspectTech) is an asset management software for inspection, data collection and storage, maintenance of inventory data, and management of all types of infrastructure assets, including bridges and tunnels. This software is utilized by DOTD to inventory assets, track inspection data, and manage agency asset quantities. Refer to Section 7.3 – AssetWise Overview for further information.

The previous data storage system, the Master Structure File (MSF) database (used from approximately 1978 through April 2016), also known as the Structure Inventory Database (STRM), is no longer the system of record and is currently used as a reference for bridge recall numbers only. AssetWise is now storing the majority of the bridge file content (mostly inspection related data since May 2016).

The *2017 DOTD Recording and Coding Guide* should be referenced when populating SI&A data into AssetWise.

3.2. Bridge File Content

Evolution

Bridge inventory and inspection data was previously stored in STRM. All other bridge file material was stored in hard copy file folders and on DOTD electronic internal network drives. Construction plans, as-built drawings, and shop and working drawings have historically been retained on microfilm by the Department's General Files section and organized by project number—not directly tied to a structure number. Because these were stored on a project-by-project basis, rehabilitation and scour mitigation plans are included in the files. Pile records were documented in construction project field books that are warehoused by the General Files section.

- **Maintenance and Repair History –** Repairs done by contract should be referenced in the Bridge Inspection notes following the repairs. Details are stored in the project specifications/plans as noted above. Repairs conducted by the District or the State were generally done as a result of a recommendation in an inspection report and should be referenced in the subsequent report to the repair.
- **Inspection History –** Inspection reports prior to 2004 were stored in hard copy folders and are being archived to Content Manager. Between 2004 and 2007, the reports were scanned into Content Manager. Since 2007, inspection reports have been stored in PONTIS and scanned into the DOTD network drive. PONTIS related reports will eventually be archived in Content Manager.
- **Rating Records –** Bridge ratings performed through the mid-1980s are stored in the Bridge Maintenance section's bridge files. Since that time, calculation records have been stored in the Bridge Rating Unit's files on Content Manager.

During the period of 1999 through 2005, DOTD used the LABidders software that was developed for bridge inspection documentation. During the period of 2005 through 2016, DOTD used the PONTIS software to store bridge inspection documents. Other relevant bridge files were stored in DOTD's Content Manager or DOTD internal network drives. Historical data stored in the DOTD internal network drives will eventually be moved to DOTD's Content Manager as well.

New bridge records and files created after August of 2017 are being stored electronically in the AssetWise database. The hard copy files from the STRM era are being scanned into an acceptable electronic format and are being archived to Content Manager.

Policy

All bridges on public roads must have a bridge file.

All bridges on public roads must have a bridge file. These bridge files will be reviewed in accordance with FHWA Metric #15, to contain at least the following items as applicable:

- Inspection reports
- Waterway information
- Special inspection procedures or requirements
- Load rating documentation including load testing results
- Posting documentation
- Critical findings and actions taken
- Scour assessment
- Scour plan of action (POA) for scour critical bridges and those with unknown foundations
- Documentation of post-event inspections
- Inventory and evaluation data with collection/verification forms
- Significant correspondence
- Bridge maintenance records

In addition, each bridge file will contain the following if applicable:

- Construction or as-built drawings including technical specifications
- Photographs
- Flood data
- Inspection requirements
- Traffic data/ADT
- Structure Inventory and Appraisal sheets (SI&A)
- Additional applicable data useful for maintaining the structure and ensuring the safety of the traveling public
- Accident records
- Load test data
- Coating history
- Load and superload permit information
- Team Leader qualifications for current inspections

Municipalities, parishes, toll authorities, and local bridge owners (all are referenced in this manual as "Off-System bridge owners") are responsible for maintaining a bridge file within their organization that contains the components of the bridge file that they are responsible for.

DOTD will maintain the remainder of the file via AssetWise and other historical archive locations. As a guide for Off-System bridge owners, the following table outlines responsibilities regarding the maintenance of bridge file components.

Table 3-1: Bridge File Maintenance Responsibilities for Off-System Bridges

FILE COMPONENT	DOTD RESPONSIBILITY	OFF-SYSTEM BRIDGE OWNER RESPONSIBILITY
Inspection Reports	Document inspections for any initial, routine, fracture critical, underwater, and in-depth inspection and maintain records of those inspections.	• Maintain records of special/interim and damage inspection types. • Notify DOTD if responsible parties for inspection management change.
Channel Cross-Sections/Stream Profiles	Maintain profiles (preferably within the same Plot) with initial inspection data and at each routine, fracture critical, underwater, and in-depth inspection (to include if data is gathered after an event).	Plot at each special/interim inspection for every scour critical bridge or bridge with a scour POA.

FILE COMPONENT	DOTD RESPONSIBILITY	OFF-SYSTEM BRIDGE OWNER RESPONSIBILITY
Special Inspection Procedures/ Requirements	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	Ensure special procedures are followed as necessary at special/interim inspections.
Load Rating Documentation – Load Posting/Restrictions	• 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.	• 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.
Critical Findings	• Maintain report of critical findings monthly and ensure that local owners address critical findings properly. • DOTD HQ will report to FHWA critical finding status.	Document and notify DOTD of any critical finding status per the procedures in Sections 5.17 and 7.4.
Scour Assessment	Maintain records of scour assessments in the individual bridge file for all bridges over waterways.	Perform and maintain a scour assessment on all bridges over water and provide DOTD with a copy.
Scour POA	DOTD HQ will develop and maintain updated scour POAs for scour critical bridges and unknown foundations.	• Maintain current POAs for scour critical bridges and unknown foundations. • Document any action taken after a storm event.
Inventory and Evaluation Data and Collection Forms	• Maintain and update records for bridge inventory and evaluation data. • Provide local bridge owners with copy of current bridge data on a semiannual basis.	Document and provide DOTD with all changes to bridge inventory data according to Section 3.3.

FILE COMPONENT	DOTD RESPONSIBILITY	OFF-SYSTEM BRIDGE OWNER RESPONSIBILITY
Significant Correspondence	Maintain as part of the bridge file.	• Maintain as part of the bridge file. • Provide copy to DOTD, if not generated by DOTD and is structure related.
Maintenance Records	Maintain a document of any QC/QA review to ensure that local bridge owners are maintaining maintenance records.	• Maintain maintenance records for all bridges. • Notify DOTD of changes to persons responsible for maintenance management change.

Maintaining Records

The AssetWise bridge management database is used to store all inspection reports, photographs, inventory updates, streambed profiles, hydrographic surveys, special reports, and some plan sheets. The Department's plans room server has been being utilized to store construction and as-built plans for more recent projects. Construction records have been stored in Site Manager and the Materials Lab is migrating materials data to Site Manager for future projects. All hardcopy records will be made available upon request for a minimum of 12 months and should never be discarded without electronic copies.

3.3. Updating Bridge Data

This section establishes a formal procedure for adding, deleting, and updating bridge inventory and condition information in AssetWise that conforms to CFR, Title 23, Part 650 as well as FHWA regulations and requirements, and meets the needs and responsibilities of the Department. When it is necessary to update, add or delete records in AssetWise, this section provides uniform reporting procedures and guidelines for proper documentation of the structure.

The State of Louisiana is required to collect and maintain a bridge asset inventory that contains inventory and condition information for all bridges on all public roads in the State. 23 CFR, Part 650.315 states that newly completed structures (or modifications of existing structures that would alter previously recorded inventory information) will be entered in the State's records within 90 days for bridges On-System (on the State Maintained Highway System) and 180 days for bridges Off-System.

Adding a New Bridge to the Inventory

Once a new bridge is constructed—and immediately upon completion of the project or before opening of the entire bridge to traffic (whichever occurs first)—a Bridge Inventory Form (refer to Appendix A-2) must be properly completed by the District Bridge Inspection office for each bridge built under the project. This will be done within 90 days for On-System and 180 days for Off-System. To remove a structure from the DOTD inventory, the District Bridge Inspection office should prepare an add/delete form (refer to Appendix A-4).

All forms to add or delete a structure are signed by the District ADA of Operations or District Bridge Engineer. All related forms will be submitted via email to the Headquarters Bridge Inspection Office along

with the other documents, photographs, and sketches that will become part of the bridge file. Listed below are the forms required to add or delete a bridge in AssetWise:

- Bridge Inventory Forms 1, 2, and 3 (refer to Appendix A-2) are used to add new SI&A data to a bridge file.
- Add/Delete Form (refer to Appendix A-4) are used when a structure is to be added to or deleted from the inventory. A comment section is included to state the reason for addition/deletion of a bridge. This document is required for all additions and deletions, even if the bridge is a replacement structure. If an old bridge is replaced with a new bridge in the same location, a Delete Form must be submitted showing the **old recall number and the project number** under which the replacement bridge was built.

For off-system bridges, under no circumstances will a newly constructed bridge be added to the inventory without a valid load rating, scour analysis (if over a waterway), or plans. For existing bridges recently added or acquired by the off-system bridge owner, the owner must provide a load rating and a scour analysis (if over a waterway) performed by a Louisiana licensed professional engineer.

If a local bridge owner opens a bridge to traffic without previously notifying and providing the required documentation to the DOTD, the parish will be placed in non-compliance.

When a bridge has been overlooked and was not added to the AssetWise inventory, it will be the responsibility of the District Bridge Inspection Office to immediately compile and submit forms noted above to the Headquarters Bridge Inspection Office as soon as possible.

Documentation to Add a New Bridge to the Inventory

To add a new bridge to the inventory, the following minimum documents are required:

- **Recall Numbers Request Form** (refer to Appendix A-3)
  - The recall number will be painted on or otherwise affixed to the structure in a permanent manner and in a conspicuous and easily accessible location such as on the inside face of the bridge railing or concrete barrier. A uniform location system should be used throughout the District for both On-System and Off-System bridges.
- **Add Sheets** (refer to Appendix A-4)
- **Bridge Inventory Forms** (refer to Appendix A-2)
- **Photographs**
  1) Showing the roadway approaching the structure in the direction of inventory
  2) Showing the roadway approaching the structure from the direction opposite to inventory
  3) Showing the roadway leaving the structure in the direction of inventory (taken from on the deck), if the entire structure cannot be seen in #1 or #2
  4) Showing the roadway leaving the structure in the direction opposite to inventory (taken from the deck) if the entire structure cannot be seen in #1 or #2

5) Showing the full width of the abutment and any revetment (if applicable)
6) Showing the full height of a typical substructure unit
    a. If the substructure type changes, then a photo of each type is needed
7) Showing the entire profile of the structure whenever possible
    a. This will be taken from a sufficient distance away to show most, if not all, spans (perpendicular or oblique to the bridge). For bridges over waterways or roadways, the profile photograph(s) must show the feature crossed, i.e. the waterway or the roadway.

Either or both pairs of the following photographs are also required, depending on what feature the bridge crosses over.

If the bridge is over a waterway, two additional photographs are required:

8) Showing the upstream view of the waterway
    a. This should be taken with a portion of the rail or substructure to show the skew of the waterway to the substructure units,
9) Showing the downstream view of the waterway.
    a. This should be taken with a portion of the rail or substructure to show the skew of the waterway to the substructure units.

If the bridge is over a roadway, two additional photographs are required:

10) Showing the underpassing roadway as it approaches the structure from its direction of inventory,
11) Showing the underpassing roadway as it approaches the structure from the direction opposite to its inventory.

Additional photographs showing **special details**, such as pin and hanger assemblies or connections, curved girders, other new details, special/different main span types, etc. must also be submitted if the special details are not clearly shown in the above photographs.

- **Location Map**
- **Plan Sheets or Sketches** showing:
    1) Geometric layout of the area showing the approach roadway, bridge deck, number of traffic lanes on and under the structure, and alignment of the feature crossed,
    2) Cross-section of the bridge (through the deck) with measurements indicating roadway width, rail-to-rail clearance, curb-to-curb width, out-to-out width, layout of the bent(s) and/or piers, and vertical clearance over the bridge deck,
    3) Profile of the bridge showing total length of the structure, length and type of each span, underpassing roadway(s) vertical and horizontal clearances, and width of the opening and the location and distance between the backwalls for all one-span bridges less than 25 feet long,
    4) For all movable bridges and fixed bridges over navigable waterways, the navigation vertical and horizontal clearance will be field-checked and sketched. Measurements for movable bridges will be taken in both the fully open and fully closed positions.

- **Streambed Profiles**
  - Refer to Section 5.13 for further information.
- **Bridge Inspection Report**
  - This is the initial inspection that is performed prior to or at the time the bridge is being opened to traffic. The initial inspection report establishes a base line for any defect and deterioration, including those that occurred during construction. Refer to Section 5.3 for further information.
- **Timber Rating Form**
  - For all timber bridges or bridges with timber spans, a Timber Rating Form (refer to Appendix A-14) will be completed by District Bridge Inspectors and submitted with the original add sheets for the structure. The span and bent configuration will be sketched on the back of the form. This sketch will include and identify the specific location of all deficiencies or other sub-standard conditions. Refer to Section 5.11 and Section 7.11 for further information.

Updating Bridge Inventory Data

When it is necessary to update bridge inventory data, an Inventory Update Report must be submitted via AssetWise. Updates of structural, geometric, or design information must be accompanied by as-built plan sheets or other supporting documentation such as sketches or photographs.

The Inventory Update Reports are reviewed and approved by the Headquarters Bridge Inspection Office . Local bridge owners will receive, from the DOTD District Bridge Inspection Office, a copy of the data currently entered in the inventory for their bridges each January and July. Each local bridge owner must review and correct this data and submit updates/corrections to the District Bridge Inspection Office by the compliance due dates referenced in Section 8.5. In addition, each Off-System bridge owner can obtain access approval and access the DOTD maintained bridge files via AssetWise.

Bridge Inspection personnel should adhere to the latest edition of the *2017 DOTD Recording and Coding Guide* to ensure that all bridge inventory information is coded correctly in AssetWise.

Deleting an On-System Bridge

On-System bridges may be deleted under the following circumstances:

- The old bridge was removed and replaced with a pipe, box culvert, metal arch or bridge that does not meet NBIS Federal Bridge Definition criteria (i.e. less than 20 feet opening).

Two photographs of each location must be submitted with the Delete Form, one showing the roadway in the direction of travel and one showing the profile (end view) of the pipe(s), box culvert, arch, or bridge.

- The old section of roadway was officially abandoned, and the area was physically barricaded to prevent access to vehicular traffic. When a section of highway is abandoned and there is a bridge to be deleted from inventory, the District Bridge Inspection personnel should include a copy of the Revision to State Highway System memo (generated and disseminated from the AssetWise System) when submitting Delete Forms to the Headquarters Bridge Inspection Office.

One photograph of the location showing the closed roadway in the direction of travel will be submitted with the Delete Form and all accompanying documentation. If the bridge is not visible from the closure location, a map indicating the location of the bridge and closure points must accompany the photo.

Deleting an Off-System Bridge

Off-System bridges may be deleted under the following circumstances:

- The old bridge was removed and replaced with a pipe, metal arch, box culvert, or a bridge that does not meet NBIS Federal Bridge Definition criteria (i.e. less than 20 feet opening).

- The bridge has been closed for five consecutive years and is not programmed for replacement under the Federal Aid Off-System Bridge Program.

    1) Two photographs of each location will be submitted with the Delete Form, one showing the roadway in the direction of travel and one showing the profile (end view) of the pipe(s), arch, or box culvert, or bridge.
    2) A letter will be prepared and sent to the Owner notifying them that the bridge is being deleted and is now considered ineligible for replacement.

- The bridge is permanently, physically closed and will not be re-opened.

NOTE: Closure will include locked gates, deep beam barriers, and other similar devices capable of preventing traffic from using the bridge. Closure does not include piles of dirt, saw horse barricades, timbers across the roadway, or signs alone. It must be a physical positive barrier.

Temporary Off-System Bridges Remaining in the Inventory

Off-System bridges temporarily replaced with a small pipe or other structure in order to maintain traffic can remain in the inventory up to **five** years. The record will be flagged to indicate that the old bridge is no longer in service. While the old bridge will not be deleted from inventory, the following updates in AssetWise for the SI&A items are necessary:

- 10 – Inventory Route Minimum Vertical Clearance
- 41 – Structure Open, Posted, or Closed = E
- 47 – Inventory Route Total Horizontal Clearance
- 53 – Minimum Vertical Clearance Over Bridge Roadway
- 54 – Minimum Vertical Underclearance
- 55 – Minimum Lateral Underclearance on Right

- 56 – Minimum Lateral Underclearance on Left
- 103 – Temporary Structure Designation = T
- If there is no permanent bridge, Items 64 and 66 should be coded as "000" even though the temporary bridge might be rated for full legal load.

**Note: The above items should be coded for the temporary structure.*

Once the permanent structure is complete and open to public traffic, an NBIS initial inspection is to be completed and updated SI&A data submitted on the applicable Bridge Inventory forms to the Headquarters Bridge Inspection Office within 180 days. An Add Form to add the new bridge and a Delete Form to delete the old bridge must be prepared by the District Inspection Office.

Replacing an Old Bridge/Same Location

Where an old bridge is replaced with a new bridge in the same location, a Bridge Inventory Form as well as an Add and Delete Bridges Worksheet must be submitted showing the old recall or report number and the project number under which the replacement bridge was built.

3.4. Classifying DOTD Bridges

Louisiana's bridges are classified as either On-System or Off-System.

On-System bridges are bridges located on state-maintained highways.

Off-System bridges are bridges on any route that is not a state-maintained highway. Off-System bridges may not be on state-maintained highways but can be part of the National Highway System.

Qualifying Inventory Structures

A qualifying bridge for the National Bridge Inventory is defined by 23 CFR 650.305 as a structure (including supports) erected over a depression or an obstruction, such as a waterway, highway, or railway and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet (6.1 meters) between under copings of abutments or spring lines of arches, or extreme ends of openings for multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.

Note: Obtaining the measurements for Item 112 NBIS *Bridge Length* is not necessarily the same as obtaining measurements for Item 48 *Structure Length*. Refer to the *DOTD 2017 Recording and Coding Guide.*

DOTD does not have an asset management program in which bridges and culverts under 20 feet in length are inspected on Off-System routes. DOTD Districts are authorized to include minor structures (less than 20 feet in length) for bridges and culverts on On-System routes and properly code Item 112 NBIS Bridge Length.

3.5. FHWA Definitions

Good, Fair or Poor Condition Classification

These terms are defined in accordance with the *Pavement and Bridge Condition Performance Measures final rule 490.409,* published in January 2017. The bridge condition is determined by the lowest rating of National Bridge Inventory (NBI) condition ratings for Item 58 (deck), Item 59 (superstructure), Item 60 (substructure), or Item 62 (culvert). If the lowest rating is greater than or equal to 7, the bridge is classified as good; if the lowest rating is 6 or 5, the classification is fair; or if the lowest rating is less than or equal to 4, the classification is poor

Structurally Deficient

This term was previously defined in *Additional Guidance on 23 CFR 650 D* as having a condition rating of 4 or less for Item 58 (deck), Item 59 (superstructure), Item 60 (substructure), or Item 62 (culvert), or having an appraisal rating of 2 or less for Item 67 (structural condition) or Item 71 (waterway adequacy).

Beginning with the 2018 data archive, the term structurally deficient is defined the same as the poor condition classification in accordance with the *Pavement and Bridge Condition Performance Measures Final Rule*, published in January 2017.

Structurally deficient is a category given to a bridge that has significant load-carrying elements in poor or worse condition, or where the adequacy of the waterway opening provided by the bridge is determined to be insufficient to the point of causing overtopping with intolerable traffic interruptions. Beginning with calendar year 2018 and each calendar year thereafter, FHWA will determine the minimum bridge condition level by considering structurally deficient as a category given to a bridge with any component in poor or worse condition as defined in 490.405 and described in section 490.411 and 490.413.

Federal Bridge Condition Criteria - 23 CFR Part 490.409(b)	
Metric	**Range**
Good	**9 - 7**
Fair	**6 - 5**
Poor	**4 - 0**

Structurally deficient calculations are automatically performed in AssetWise in accordance with the *Pavement and Bridge Condition Performance Measures Final Rule*, published in January 2017.

It is most important for the public to understand that “Structurally Deficient” bridges generally require traffic and/or load posting restrictions and will remain safe for travel as long as trucks exceeding the posted load limit do not cross that bridge.

Bridges that are considered unsafe are closed until they can be repaired or replaced. If funding for extensive repairs or replacement does not appear to be available in a reasonable time, complete removal of these unsafe bridges may be the correct option.

Functionally Obsolete

This term was previously defined in *Additional Guidance on 23 CFR 650 D* as having an appraisal rating of 3 or less for Item 68 (deck geometry), Item 69 (underclearances), or Item 72 (approach roadway alignment), or having an appraisal rating of 3 for Item 67 (structural condition) or Item 71 (waterway adequacy). Functionally obsolete is a legacy category that was used to determine funding eligibility under the previous Highway Bridge Program, which was discontinued with the enactment of MAP-21. As a result, federal fiscal year 2015 was the last year outstanding Highway Bridge Program funds could be obligated on eligible projects, including ones with bridges that were once categorized as functionally obsolete. Therefore, FHWA is no longer tracking this category. The focus has shifted to a performance-based program for the NHS as established in MAP-21 and continued in the Fast Act. As such, the DOTD Bridge Inspection Office encourages the use of the good-fair-poor bridge condition measures for all structures as outlined in the *Pavement and Bridge Condition Performance Measures Final Rule*, published in January 2017.

Performance-Based Planning

Performance-based planning and programming is a system-level, data-driven process to identify strategies and investments. DOTD released the State's official adoption of the 2019 Federal NHS Transportation Asset Management Plan on June 27, 2019, located here: http://www.tamptemplate.org/wp-content/uploads/tamps/036_louisianadotd.pdf

Bridge performance measures identified in Section 3.8 of the TAMP include the following:

- The State will maintain bridges so that the percentage of the deck area of bridges classified as Structurally Deficient (i.e. if the load-carrying elements are in diminished condition due to deterioration and/or damage) does not exceed 10%. The performance measure of percent of structurally deficient bridges by deck area was adopted after the Katrina/Rita hurricane events.
- Bridges that are considered unsafe for any reason are immediately closed until they can be repaired or replaced.

Bridge Preservation

Bridge preservation is defined as actions or strategies that prevent, delay, or reduce the deterioration of bridges or bridge elements.

The State of Louisiana has recognized that the only sustainable method for future economic development is to move away from capacity projects and towards a focus on preservation. A "Preservation First" strategy effectively results in a spending approach that uses the very limited available funding on many more assets, essentially preserving these assets in as close to their current condition as possible, and not spending the money replacing a small number of assets in far worse condition. Maintenance activities and minor preservation treatments, such as chip seals, crack sealing, etc., do not reset the pavement age, but clearly extend the service life of pavements. The Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act recognized preservation as a vital component of achieving and sustaining a desired state of good repair of highway facilities. Bridge preservation is eligible for Federal funding. However, it is important to differentiate between routine

maintenance and cost-effective preservation activities that extend the service life of a structure. Routine maintenance is not eligible for Federal funding.

A successful bridge program seeks a balanced approach to preservation and rehabilitation/replacement. LADOTD uses bridge inspection data to track and monitor the conditions of wearing surfaces, coatings, surface sealers, and joint seals, and update intervals for scheduled replacement accordingly. Since the results of completed preservation projects are not recorded until the next scheduled bridge inspection, it may take multiple inspection cycles to effectively measure the program's performance.

LADOTD is striving to be more strategic by adopting and implementing systematic processes for bridge preservation as an integral component of their overall asset management.

3.6. Structure Numbering

Structure ID

DOTD identifies bridge structures by a six-digit numerical recall number. For both On-System bridges and Off-System bridges, the recall number is issued per the *Recall Number Request* form (see Appendix A-3). Recall numbers are generated by the DOTD Headquarters Bridge Inspection Office.

At the time the recall number is issued, the NBI Item 8 – Structure Number is also generated. The current NBI Item 8 numbering format is a 15-digit number that begins with a two-digit District number and a two-digit Parish number and includes the recall number within the last six digits of the 15-digit NBI number.

Although DOTD previously generated 14-digit structure numbers to identify bridges, this is no longer part of the policy and these numbers are not issued. Those structure numbers (for On-System) consisted of district, parish, control section, log mile, and directional ID values. They are part of the historical bridge file for reference purposes only.

Structure Type Codes

Structure type codes are identified by a six-letter code. All structure type codes are referenced in Appendix A-6 of this document.

CHAPTER 4:
SAFETY PRACTICES

CHAPTER 4. SAFETY PRACTICES

4.1. INTRODUCTION

The DOTD Bridge Inspection Program encompasses inspection activities that are potentially hazardous to inspectors and the public. Specific hazards associated with each site and inspection task may be different; however, to protect the health and safety of inspectors and the public, potential hazards should be identified and mitigated. Refer to the DOTD Loss Prevention Safety Manual and the FHWA *BIRM, Chapter 2* for further guidance.

Some activities that may pose a potential health and safety risk are stopping and parking near traffic, walking on or adjacent to bridges, walking through vegetation, wading through water, climbing on bridge elements, climbing into limited access areas such as the interior of box girders, using access equipment such as lifts and ladders, and diving around bridge foundation elements.

Employees will be aware of and trained to recognize workplace hazards, have the necessary equipment to safeguard health and safety, and have established health and safety procedures and practices and an emergency action plan.

Non-DOTD employees must sign a consent form before being exposed to operational hazards and equipment owned by DOTD.

With careful planning and preparation, potential environmental, health, and safety hazards can be mitigated. However, incidents may still occur, so planning for emergencies is necessary. Knowing the location of the nearest medical services, type of services provided, how to contact them, and how to access them may save the life of an injured person.

4.2. JOB SAFETY ANALYSIS

Job safety analysis (JSA) is the systematic examination of a job intended to identify potential hazards, assess the level of risk, and evaluate practical measures to control the risk. The JSA should be proactive. Hazards should be recognized, and control measures implemented at the planning and organizing stages of the work.

Job safety analysis documents for DOTD employees are prepared by the Loss Prevention section. Non-DOTD employees under contract to perform inspections for DOTD should observe and prepare relevant JSAs when needed.

JSA involves analyzing each basic task of a job to identify potential hazards and determine the control measures necessary to do the job safely. Experienced workers and supervisors should perform a JSA by analyzing jobs through discussion and observation. The JSA should determine ways to eliminate or mitigate identified hazards.

JSAs are living documents. Therefore, you should prepare the JSA based upon the best available information for the site. When you arrive at the site, reassess the conditions and update or revise the JSA as necessary to address current conditions. Updates or revisions may be handwritten on the document. If it is determined that the team is not prepared for current conditions, then the team should obtain the appropriate equipment and/or personnel to conduct the work safely.

Revisions to a JSA may be needed under certain circumstances. Some considerations are as follows:

- At the beginning of each work week
- When plans change
- When conditions change
- When risk increases for any reason, specifically, for all underwater inspections, confined space inspections, for any work at height, work over water, or in high traffic areas.

4.3. Personnel Protective Equipment

Personnel protective equipment (PPE) will be provided for all work as necessary to comply with the recommendations of the JSA and as required by DOTD. As a minimum, personnel should wear Class II or III clothing or vests in low traffic areas with a speed limit less than 35 mph, and Class III clothing or vests in all other locations. Information on required and approved PPE can be found in the DOTD Loss Prevention Safety Manual.

In identified hazardous conditions such as confined space entry, snake-infested areas, alligator feeding areas, use of aerial lifts and fall protection, inspections in low-visibility conditions, or night-time inspections (only allowed under emergency circumstances), the appropriate PPEs will be identified in the JSA. PPE will be provided to employees, and personnel will be trained in their use.

4.4. Vehicular Equipment

Vehicles and equipment used for inspections will be equipped with at least the minimum permanently affixed red-amber warning lights per EDSM_I_4_3_1 *Use of Red-Amber Warning Lights on DOTD Vehicles/Equipment*. Cones and warning signs will be used per the requirements of the *Manual on Uniform Traffic Control Devices for Streets and Highways.* Alterations to normal traffic flow demand a high degree of visibility.

4.5. Fall Protection

Employees exposed to potential falls will have fall protection such as guardrails, safety nets, or personal fall arrest systems. All employees exposed to falls will be trained in the use of the equipment. It is important to understand that when regulation mandates the use of competent persons, the employer must determine the ability of such individuals and designate them accordingly by their knowledge of standards, experience in the task at hand, and ability to take corrective action.

Protection from falls is required whenever there are unprotected sides or edges or holes or openings 4 feet or more above a lower level. An opening means a gap or open space that is at least 30 inches high and at least 18 inches wide through which an employee can fall to a lower level or onto a hazard. Ladders that extend more than 24 feet above a lower level also require fall protection.

A competent person or qualified person will inspect each lanyard or lifeline before being used. Personal fall protection equipment must be inspected before the initial use by each work shift. Equipment failing to pass inspection will be taken out of service. Personal fall protection equipment will meet the requirements of the DOTD Loss Prevention Safety Manual.

4.6. Aerial Lifts

An aerial lift, as defined by OSHA, is any vehicle-mounted device (powered or manually operated) used to elevate personnel, including:

- Extendable or articulating boom platforms
- Vertical towers
- Aerial ladders

Aerial lifts are equipment that needs to be maintained and operated in a safe manner. Personal fall protection equipment will be used when working in an aerial lift per the DOTD Loss Prevention Safety Manual.

Bridge inspectors operating aerial lifts will be trained in the use and operation of the specific type of aerial lift being used (refer to ANSI A92.24). The DOTD offers yearly training classes for the under bridge inspection units in accordance with the equipment manufacturer. All new bridge inspectors should receive this training – contact the Headquarters Bridge Inspection Office for details.

4.7. Confined Space

Employees exposed to confined spaces will be trained and knowledgeable in the safe access to a confined space and have appropriate safety equipment and PPE. A confined space is defined as a space that: 1) is large enough and so configured that an employee can bodily enter and perform assigned work; 2) has limited or restricted means for entry or exit; and 3) is not designed for continuous employee occupancy (for example, box girders and pits are spaces that may have limited means of entry).

A permit-required confined space is a confined space that additionally: 1) contains or has a potential to contain a hazardous atmosphere; 2) contains a material with a potential for engulfing an entrant; 3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section; or 4) contains any other recognized serious safety or health hazard. Permit-required confined spaces require a permit-required confined space program, and all work will comply with the DOTD Loss Prevention Safety Manual.

In some cases, respiratory protection may be necessary to protect inspectors from known respiratory hazards. Employees will have approved respirators that are clean, sanitary, and in good working order.

In areas of nutrient-rich accumulations of bird droppings, airborne fungal spores in the form of *Histoplasma Capsulatum* and *Cryptococcus Neoformans* may cause infections in humans known as Histoplasmosis and Cryptococcosis. The keys to mitigating the risk of exposure are to avoid exposure, to wet contaminated areas before digging or working, wear an effective respirator, or combinations thereof.

Respiratory protection will comply with the DOTD Loss Prevention Safety Manual (refer also to OSHA 1910.134 *Respiratory Protection)*.

4.8. Work Zone Traffic Controls

Working in and around traffic can cause safety hazards to the inspectors and to the public. It may also cause disruption to the normal traffic flow. Therefore, careful planning for the inspection is essential to allow the safe inspection of a facility and to minimize the risk to the public. Traffic control devices notify road users of regulations and provide warning and guidance needed for the uniform and efficient operation of all elements of the traffic stream in a manner intended to minimize the occurrences of crashes. Alternations to normal traffic flow demand a high degree of visibility.

The *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) and the *DOTD Temporary Traffic Control* (TTC) Standards will be used for designing and implementing traffic control in work zones for bridge inspections. Refer to Section 4.13 for these references.

All inspections requiring lane closures will be approved by the District Traffic Engineer and the District Bridge Engineer or DOTD Headquarters Bridge Inspection Office. Temporary traffic controls are for periods of closures of three days or less. For closures longer than three (3) days, a comprehensive traffic control plan (TCP) will be implemented. Discuss coordination and planning for all potential lane closures and provide a notice for TCP approval and myDOTD website posting no less than 7 days prior to a bridge inspection.

4.9. Construction Zones

Bridge inspections are often due to be performed during ongoing construction activities. Construction zones can be established for repair, rehabilitation or new bridge construction. Bridge Inspectors should make every effort to fully understand all scheduled bridge operations prior to arriving on site. Hazard identification and mitigation, specifically in construction zones, can prevent injuries and save lives.

Bridge Inspectors should identify the location of all heavy machinery near the bridge site and fully understand the operation plans of each.

Should there be any safety hazard with observed risk that cannot be mitigated during the planned bridge inspection, the bridge inspection should be rescheduled in collaboration with the District Bridge Engineer, the project engineer and the owner. Refer to Section 5.9 for protocol on delaying inspections.

4.10. Wildlife Precautions

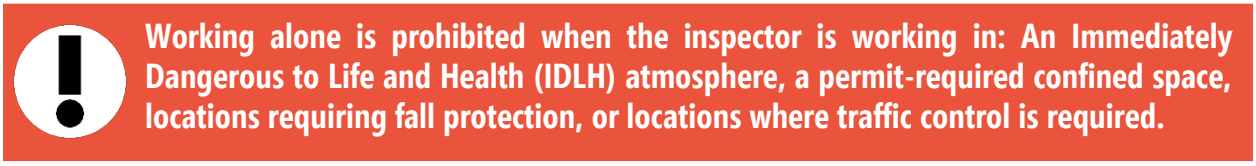
Inspectors work near potentially harmful wildlife on virtually every bridge inspection. Therefore, it is essential that each inspector becomes familiar with the wildlife that may be encountered that could present a potential safety hazard. In Louisiana, inspectors may be exposed to alligators, bears, bees, copperheads, coral snakes, cottonmouth (water moccasins), fire ants, hornets, mosquitos, rattlesnakes, scorpions, spiders, marine mammals, fish and other animals. Inspectors can drastically reduce the risk of biting injuries with a basic knowledge of hazard awareness, hazard mitigation, and an on-site vigilance of the presence of these creatures.

An added safety measure should be considered when performing underwater or in-water inspections around dense alligator populations. A Louisiana-approved nuisance alligator trapper can be contracted to manage alligators for Bridge Inspectors. Prior to contracting an approved trapper, contact the Headquarters Bridge Inspection Office for approval.

4.11. Working Alone

Working alone applies when an inspector is working alone at a site, and assistance is not readily available if there is an emergency or if the inspector is injured or ill. Working alone **is strongly discouraged and should be avoided**; at least two individuals should make up a bridge inspection team. If it involves an initial, routine, fracture critical, underwater, or in-depth inspection, one of those individuals must be a qualified Team Leader, since it is required that a qualified Team Leader be on-site for those types of inspections. Each DOTD district is responsible for implementing safe working procedures and dictating when inspectors would be allowed to travel to a bridge site alone.

The safe work procedure for communication provided for an inspector who works alone and stand-by persons capable of assisting the worker in an emergency or if the worker is injured or ill could be: two-way radio, telephone, cell phone, or other electronic type of communication after assurance and once it is proven that the equipment will function properly. When electronic communication is not practicable or readily available at the worksite, an alternate form of proven communication will be implemented for workers who work alone. The inspector should inform personnel available to contact or visit the inspector especially if communication is interrupted/discontinued. The visits or contacts could be at intervals of time appropriate to the nature of the hazards associated with the work being performed by the inspector.



4.12. Emergency Procedures

Workplace emergencies can happen at any time and at any place. Because it is hard to think clearly during an emergency, it is essential that you have a plan to aid in your response.

Emergency planning is the first step. An assessment should be made as to what emergencies could affect the work, who will lead and make decisions during an emergency, and what procedures will ensure that inspectors respond appropriately. These elements are the foundation of our emergency planning.

Emergency planning may not prevent emergencies, but it can protect lives, equipment, and property. The inspectors should have a written plan for workplace emergencies so that you and your co-workers respond appropriately when an unlikely event happens.

The emergency procedures should include a contact protocol, and documentation and filing procedures with the DOTD. Refer to the DOTD Loss Prevention Safety Manual for incident forms and required reports.

4.13. REFERENCES

Due to the complexity of occupational health and safety and public safety, a variety of references may be needed. Listed are some of the references that may be associated with bridge inspections:

- DOTD Temporary Traffic Control
- DOTD Loss Prevention Safety Manual
- Manual on Uniform Traffic Control Devices for Streets and Highways

The DOTD Loss Prevention office at HQ or the district safety officer in the District can be contacted for more information.

CHAPTER 5:
BRIDGE INSPECTION PROCEDURES

CHAPTER 5. BRIDGE INSPECTION PROCEDURES

Field inspections will be conducted on a routine cycle with defined frequencies based on the NBIS inspection type and requirements.

A typical NBIS routine field inspection will focus on the following components:

- Traffic safety features
- Deck
- Superstructure
- Substructure
- Roadway approaches
- Channel and slope protection, and
- Field postings or physical restrictions

A typical approach for routine field inspections includes the following actions:

- Identify work completed since last inspection.
- Complete a visual/hands-on inspection of bridge components and document the summary of conditions, findings, and deficiencies for each component (include fracture critical hands-on inspection assurance, if performed).
- Document deficiencies with labeled photograph(s) for report insertion.
- Determine if previous NBI ratings and element condition states are still applicable for each component based on current findings.
- Identify repair recommendations and work order priority levels.
- Include or update any inspection or bridge notes (such as inspection team members, temperature, type of inspection, any element or portion of an element(s) not able to be inspected, summary of element(s) being closely monitored, any vehicle or vessel impact information, any aspect noticed not noted within the element, etc.).
- If required to be posted/restricted, include illustration photographs.
- If over a waterway, gather profile data.

5.1. PERSONNEL QUALIFICATIONS

Prior to deploying bridge inspectors to the field, personnel qualifications must be verified.

The National Bridge Inspection Standards (NBIS) require that personnel responsible for performing bridge inspection, approval, and load ratings meet certain training and experience requirements. The DOTD's ADA of Operations, and the District Bridge Engineer must meet the same qualifications as the NBIS "Program Manager."

Qualifications and Training

Qualifications required for individuals (Program Manager, Team Leader, diver, and load rating engineer) with specific responsibilities for evaluating bridge safety on public roads are set out in 23 CFR 650, Subpart

C. Each field inspector will include their first and last name on the bridge inspection reports to match their certifications.

Refresher Training: All persons with required or delegated duties of inspection such as, Team Leaders, or Program Managers must complete pre-approved bridge refresher training every five years. A minimum of **1.8 CEU** (18 PDH) is needed to fulfill the bridge refresher training requirement. Refresher training will be completed within a two-year period of the five-year deadline. The training course start date will set the beginning of the next five-year period. If training requirements are not fulfilled the position duties are forfeit, work performed during the period of non-compliance will be questionable and considered invalid (See Section 5.2). In the State of Louisiana, the following training courses are acceptable to present to the Headquarters Bridge Inspection Office to fulfill the refresher training requirement.

NHI Course #	Course Description	CEU
130053	Bridge Inspection Refresher Training	3.4
130054	Engineering Concepts for Bridge Inspectors	3.0
130055	Safety Inspection of In-Service Bridges	6.7
130056	Safety Inspection of In-Service Bridges for Professional Engineers	3.4
130078	Fracture Critical Inspection Techniques for Steel Bridges	2.5
130091	Underwater Bridge Inspection	2.4
130091B	*Underwater Bridge Repair, Rehabilitation, and Countermeasures*	*1.4*
130099A	Bridge Inspection Nondestructive Evaluation Seminar	1.9
130092	Load and Resistance Factor Rating of Highway Bridges	2.4
135046	Stream Stability and Scour at Highway Bridges	2.0
135047	*Stream Stability and Scour at Highway Bridges for Bridge Inspectors*	*0.6*

Copies of all NHI (or other approved) training course completion certificates must be submitted to the Headquarters Bridge Inspection Office immediately upon completion of the course.

The Headquarters Bridge Inspection Office will track bridge inspector, Team Leader, inspection supervisor, ADA of Operations, District Bridge Engineer, and Program Manager training and/or minimum qualifications. They will also monitor other entities and the qualifications of consultant Team Leaders and divers that participated or will participate in a Louisiana Bridge Inspection Program during any portion of or the entire calendar year.

Program Manager

The Program Manager for the State of Louisiana shall meet the requirements of **23 CFR 650**: *Must be a registered professional engineer, and successfully complete a FHWA approved comprehensive bridge inspection training course.*

Certification and training dates will be recorded by the Headquarters Bridge Inspection Office . Periodic reviews of maintaining an active professional engineer license and training dates will help ensure proper scheduling of required training courses.

Load Rating Engineer

The load rating engineer for the State of Louisiana will be a licensed registered professional engineer as required by EDSM IV.4.1.2 and 23 CFR 650: *The individual charged with the overall responsibility for load rating bridges must be a registered professional engineer.*

Certification will be demonstrated by maintaining an active professional engineer license and having overall responsibility for load rating bridge policies.

Team Leaders

Bridge Inspection Team Leaders for the State of Louisiana will meet the requirements of 23 CFR 650: *There are five ways to qualify as a Team Leader. A Team Leader must, at a minimum:*

1) Have the qualifications of the Program Manager; or
2) Have five years bridge inspection experience and have successfully completed an FHWA approved comprehensive bridge inspection training course; or
3) Be certified as a Level III or IV Bridge Safety Inspector under the National Society of Professional Engineers' program for National Certification in Engineering Technologies (NICET) and have successfully completed an FHWA approved comprehensive bridge inspection training course; or
4) Have all of the following:
    i. A bachelor's degree in engineering from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology;
    ii. Successfully passed the National Council of Examiners for Engineering and Surveying Fundamentals of Engineering examination;
    iii. Two years of bridge inspection experience; and
    iv. Successfully completed an FHWA approved comprehensive bridge inspection training course; or
5) Have all of the following:
    i. An associate's degree in engineering or engineering technology from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology;
    ii. Four years of bridge inspection experience; and
    iii. Successfully completed an FHWA approved comprehensive bridge inspection training course.

Certification and training dates to include any supportive bridge inspection experience documentation, when required, will be recorded and maintained by the Headquarters Bridge Inspection Office via AssetWise. A periodic review of the database will help ensure proper scheduling of required training courses.

Louisiana's bridge inspection program acceptable FHWA approved comprehensive bridge inspection training course consist of:

- NHI #130055 Safety Inspection of In-Service Bridges (10 Days), or
- NHI #130056 Safety Inspection of In-Service Bridges for Professional Engineers (5 Days).

For consultant-led bridge inspections, the requirements outlined above will be used as a basis for minimum personnel requirements during the consultant selection process and all certifications submitted or transmitted before work commence or as allowed within Section 5.4 and will be maintained will be maintained in AssetWise.

For bridge inspections led by other entities, the requirements of 23 CFR 650 will be used as a basis for minimum personnel qualification requirements.

Individuals who participated as a Team Leader during the inspection will be identified in the report.

Underwater Inspection Divers

Underwater bridge inspections for On-System and the majority of Off-System bridges are conducted by consultants contracted through the Headquarters Bridge Inspection Office . All underwater bridge inspectors will meet the requirements of 23 CFR 650: *An underwater bridge inspection diver must complete an FHWA approved comprehensive bridge inspection training course or other FHWA approved underwater diver bridge inspection training course.* Louisiana's bridge inspection program also requires that a diver be a professionally trained commercial diver through the Association of Diving Contractors International (ADCI); acceptable credentials will be provided to the Headquarters Bridge Inspection Office.

Individuals who participated as a Team Leader and a diver during an Underwater Inspection will be identified in the report.

Louisiana's bridge inspection program acceptable diver's training course consist of:

- NHI #130055 Safety Inspection of In-Service Bridges (10 Days), or
- NHI #130056 Safety Inspection of In-Service Bridges for Professional Engineers (5 Days), or
- NHI #130091 Underwater Bridge Inspection (4 Days).

5.2. Personnel Responsibilities

There are five basic responsibilities for those involved in the Bridge Inspection Program:

- Maintain public safety and confidence
- Protect public investment
- Provide bridge inspection program support

- Maintain accurate bridge records
- Fulfill legal responsibilities

The DOTD Bridge Inspection Program is comprised of many individuals in various roles. The roles are identified, and the primary responsibilities are described in detail in the FHWA 23 CFR 650.309, FHWA BIRM and EDSM No. IV 4.1.2. Refer to Section 9 for hyperlinks to these documents.

Program Manager and Load Rating Engineer

The NBIS Program Manager for the State of Louisiana is the Bridge Maintenance Administrator, DOTD Section 51 (refer also to EDSM IV.4.1.2). This position is responsible for establishing policies and procedures that affect the inventory and inspection of all bridges on publicly owned and operated roads in the State of Louisiana in order to meet or exceed the compliance requirements of 23 CFR 650, Subpart C. The Program Manager certifies that bridge inspection program participants have the proper credentials and approves their experience justifications. The Program Manager can remove or reinstate a bridge inspection Team Leader or diver qualification if the inspection work performed is or had been deemed unacceptable. If an inspection(s) is performed by individuals without the minimum proper credentials, the Program Manager will determine the acceptability or the need to have the structure(s) re-inspected by qualified staff.

Several duties are delegated to others in each DOTD district who meet the requirements for this position to streamline the program process. In order to provide seamless operation of inspections and inspection report approval, DOTD uses a dual review and approval process for inspection reports. Final approval is conducted by the District Bridge Engineer, who must be a licensed engineer and meet the minimum NBIS training and refresher training requirements as the Program Manager.

The position of Load Rating Engineer is the Assistant Bridge Design Administrator, DOTD Section 25, (refer also to EDSM IV.4.1.2), who is responsible for creating policies and procedures for conducting and reporting the safe load-carrying capacity of all bridges on publicly owned and operated roads in the State of Louisiana. The individual holding this position must meet all requirements of the Load Rating Engineer as set out in 23 CFR 650, Subpart C and Section 5.1.

Team Leaders and Inspectors

A Team Leader is the lead inspector on initial, routine, underwater, fracture critical, and in-depth inspections.

The Team Leader is responsible for organizing, preparing, documenting, and managing a safe, thorough inspection of bridges. There could be several individuals meeting the qualifications of a Team Leader on any given inspection, but only one will have the Team Leader inspection responsibilities and should be properly identified on the report. DOTD personnel will assign the Team Leader upon report creation in AssetWise and within the report *inspection comments* section. All non-DOTD personnel will clearly document the Team Leader in their report and DOTD personnel will ensure the Team Leader is documented in the *inspection comments* section of AssetWise.

Team Leaders may not delegate their duties and responsibilities to subordinate bridge inspectors until the inspector meets the requirements of a Team Leader and has been approved or certified to fulfill the duties of Team Leader. Requests for certification and/or approval for Team Leader status must be submitted in writing to the Headquarters Bridge Inspection Office.

A Team Leader will also provide effective on-the-job training for bridge inspectors in the proper inspection technique, only allowing bridge inspectors to perform un-assisted inspections of bridge components in areas of demonstrated competence, with the acknowledgement that the inspection and documentation responsibility cannot be delegated.

5.3. DOCUMENTATION

DOTD maintains a complete, current, and historical record of each bridge. Proper documentation is imperative. The inspection report is a record of the bridge's observed condition and must be thorough. Gather enough information for a comprehensive and complete report.

Electronic data collection is becoming the preferred method of gathering information. This method allows the inspector to retrieve and update/edit a previous report record with new observations and save the latest observations as a current report. This saves time and minimizes errors from transferring data from field notes. Electronic data collection also provides a logical and systematic sequence of inspection. DOTD encourages all inspectors to input bridge data via the AssetWise tablet application.

Hand sketches on paper may still be the best method to present critical or widespread deficiencies and they can easily be scanned into an acceptable electronic format.

Planning, Preparation, and Approval

Planning and preparation are key to providing cost and time sensitive inspections of bridges and culverts. The District bridge inspection list (obtained from monthly AssetWise queries) will be reviewed by the District Bridge Engineer to determine an efficient and appropriate grouping for structures related to equipment needs, maintenance-of-traffic (MOT) issues, location, and other key requirements to provide cost-efficient and timely inspections. Once this information has been reviewed by the District Bridge Engineer, the MOT and equipment needs will be scheduled, required agency coordination (e.g., with CSXT and Norfolk Southern) will be completed as needed, and an inspection plan will be prepared for each structure. Checklists are typically provided throughout the planning phase to ensure that all background information is reviewed, with emphasis placed on previously denoted deficiencies, repairs, fracture critical members, and/or fatigue sensitive details on the bridge.

Standardization provides consistency, and consistency maintains accuracy.

5.4. Inspection Types and Frequencies

Each On-System and Off-System bridge in the State of Louisiana will be inspected at a maximum interval established by the NBIS and the DOTD. Most inspection types will be required periodically and some bridges—depending on conditions, load- carrying capacity, or other deficiencies (see tables below)—will be inspected at more frequent intervals.

This section will outline when various inspection types are required, who will perform them, and what must be recorded. It is DOTD policy that a qualified Team Leader be present during the entire initial, routine, fracture critical, underwater, or in-depth bridge inspection. It is encouraged that a qualified Team Leader be involved in any special or damage inspection for On-System bridges, but this is not required.

Consultant-led inspections will be documented in the AssetWise inspection software if access approval was granted, or utilize the *Bridge Inventory Form* (See Appendix A-2) to document current conditions, element quantities, condition states, streambed profile, and inspection notes. Properly identify everyone who participates in the inspection by full name and function and attach any documentation supporting their credentials, if not already on file. This form will be submitted to the Headquarters Bridge Inspection Office as soon as appropriate, but no later than 45 calendar days after field work completion, with the final inspection report as an attachment.

Initial

The initial inspection and inventory of a bridge will be completed in accordance with Section 3.3 and EDSM IV.4.1.2.

This initial inspection report is similar to a routine inspection and requires the presence and identification (printed full name and signature) of a Bridge Inspection Team Leader. It also provides the following:

- Structure Inventory and Appraisal (SI&A) data
- Baseline condition assessment for the bridge
- Development of the element inventory and condition status
- Verification of as-built plans (if applicable)

The initial inspection report will be used by DOTD for inputting the first inspection report for a newly inventoried structure. It will NOT be used when conducting the first inspection of a rehabilitated or modified existing structure, although updates to the SI&A data would be required.

The *Bridge Inventory Form* (See Appendix A-2) should be used during the field inspection to document the current NBIS condition and appraisal ratings, element quantities, condition status, streambed profile, and inspection notes. This completed form should be attached to the inspection report when completed.

Recall numbers will be affixed to the bridge rail or painted with stencils to clearly contrast with the background. Inspectors will maintain the painted bridge numbers as needed.

Routine

A routine bridge inspection is required by NBIS at a frequency not exceeding 24 months (48 months for FHWA approved structures) and will be monitored annually by the District Bridge Engineer for compliance by verifying that inspections are done in the **same month** every two years. **Strict adherence to the NBIS routine bridge inspection cycle is required.** Late inspections will be performed immediately once they are discovered to be late. Refer to Section 5.9 for procedures concerning "delayed inspections."

Routine inspections differ from in-depth inspections in that a "hands-on" assessment of every non-FCM member is not required. Rather, in routine inspections, a full assessment of all areas at a distance acceptable to make identification of any condition changes is required, with the exception of any fracture critical element.

Structures requiring special UBIV access equipment will be inspected as a group over a period of a few weeks each year. This will allow adequate scheduling of UBIVs around the state.

All bridges containing fracture critical members require a FCM inspection type in accordance with the fracture critical policy below. FCM might also be referred to as a Nonredundant Steel Tension Member.

Although an FCM inspection is being performed, the report may be identified as a routine or routine/fracture critical inspection. If identified as solely a routine inspection and intended to cover the FCM inspection aspect or as a routine/fracture critical inspection, it still needs to be noted in the inspection notes and/or within each fracture critical element note that a hands-on inspection was performed (i.e. as a minimum: date of inspection, indication that a hands-on inspection was performed and results of that hands-on inspection).

Bridge elements in less than 3.5 feet of water will be inspected as part of the routine inspection by wading and probing for signs of deterioration or during periods of low water flow. If any portion of any submerged substructure element cannot be inspected, those elements will be documented by in the individual element notes. If any submerged substructure element cannot be inspected by wading and probing, those elements will be identified in the bridge notes documenting the need for an UWI by a diver along with a notation of how much of the element was visible for surface inspection. For the structure that requires a UWI by a diver, ensure that the inventory items (Items 92B and 93B) are properly coded on the *Bridge Inventory Form* (see Appendix A-2) and/or within AssetWise.

The routine inspection will fully document the condition of the bridge with the following:

- Current NBIS condition states
- Current element condition states
- Inventory photos (every report)
- Deficiency photos (every report)

- Sketches (as needed/updated in subsequent reports)
- Written notes of findings
- Written notes on location and identity of submerged elements in more than 4 feet of water (or otherwise inaccessible for inspection) that should be inspected and documented during an underwater inspection
- Maintenance or repair recommendations (include work request number for On-System bridges)
- Written details of repairs made and date(s)
- Streambed profile or notations of latest hydrographic survey results compared with previous survey
- Timber rating form
- Verification of SI&A data
- Verification of load posting requirements
- Verification that load ratings reflect present condition

Frequencies of routine inspections will be increased from 24 months to 12 months or 6 months if one of the following conditions exists:

Table 5-1: Conditions for Increasing Frequency of Routine Inspections

FUNCTIONAL CLASS (SI&A ITEM 26)	AVERAGE DAILY TRAFFIC (ADT)	LOWEST NBI CONDITION RATING (58-DECK, 59-SUPER, 60-SUB, OR 62-CULVERT)	MAXIMUM INTERVAL OF ROUTINE INSPECTIONS
Interstate/Principal Arterial (I26= 01, 02, 11,12 OR 14)	Any	0-2	SIX (6) months
Any	>50,000	0-2	SIX (6) months
Interstate/Principal Arterial (I26= 01, 02, 11, 12 OR 14)	Any	3-4	ONE (1) year
Any	>50,000	3-4	ONE (1) year

When an owner other than DOTD performs regularly scheduled routine inspections, the District ADA of Operations or District Bridge Engineer is responsible for obtaining a copy of the inspection form/report within 45 days after the inspection due date and transmitting it to the Headquarters Bridge Inspection Office.

Culvert

Culverts that meet the definition of a bridge are required to be inspected by DOTD to evaluate the structural condition and adequate foundation for roadway sections above. For culverts to qualify as a "bridge" on the NHS, a single culvert cell will have to be more than 20-foot clear span. A combination of culverts must span more than 20 feet with a clear distance between barrels less than half the barrel diameter of the smaller contiguous opening. The measurements of a culvert will be collected on the Bridge Inventory Form per the guidelines below in Figure 5-2.

Figure 5-1: CMP Culvert. Source: Engineering Operations.

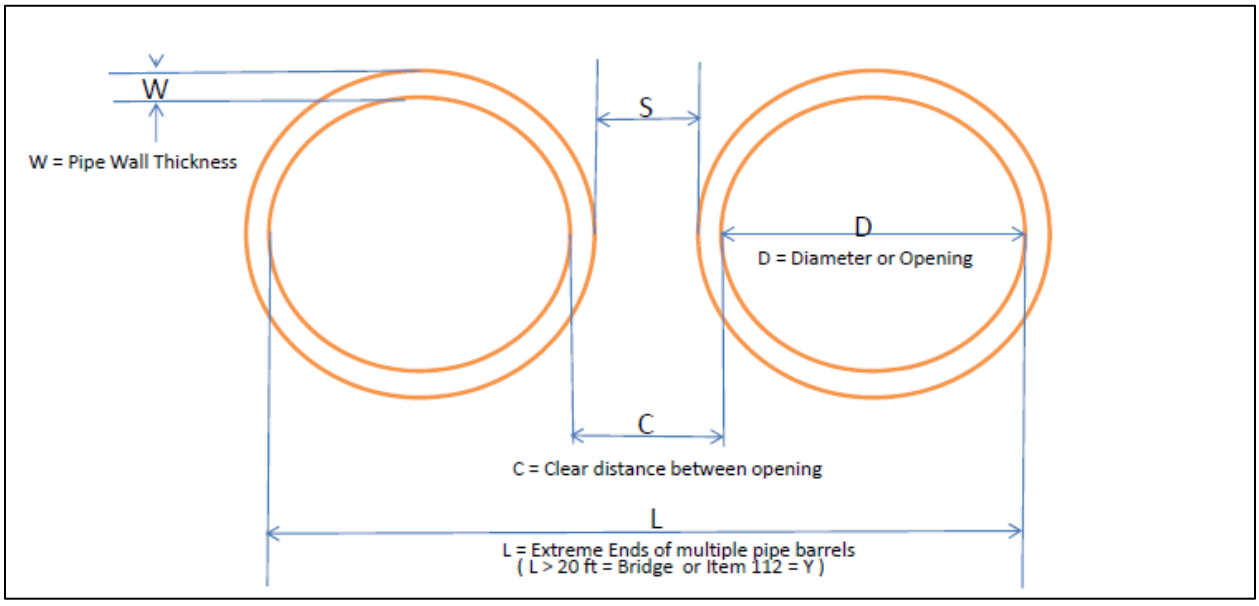


Figure 5-2: Guidelines for Measuring Culverts

Commercial divers may be needed to safely perform a complete inspection of a submerged culvert. A submerged culvert will often require a larger diver team to treat the operation as a penetration dive for safety. The minimum geometric dimensions of a submerged single barrel/box culvert that can be safely accessed by a diver is a width and height greater than 36 inches. A "submerged" culvert typically has less than 18 inches of freeboard at the time of inspection or is typically longer than 100 feet with poor air circulation.

In general, when completing an NBIS inspection of a culvert, the inspector should look for damage and distortion along the culvert walls, soffit, and floor. Typically, deterioration is located along the waterline.

Toe walls will be inspected for vertical exposure and undermining.

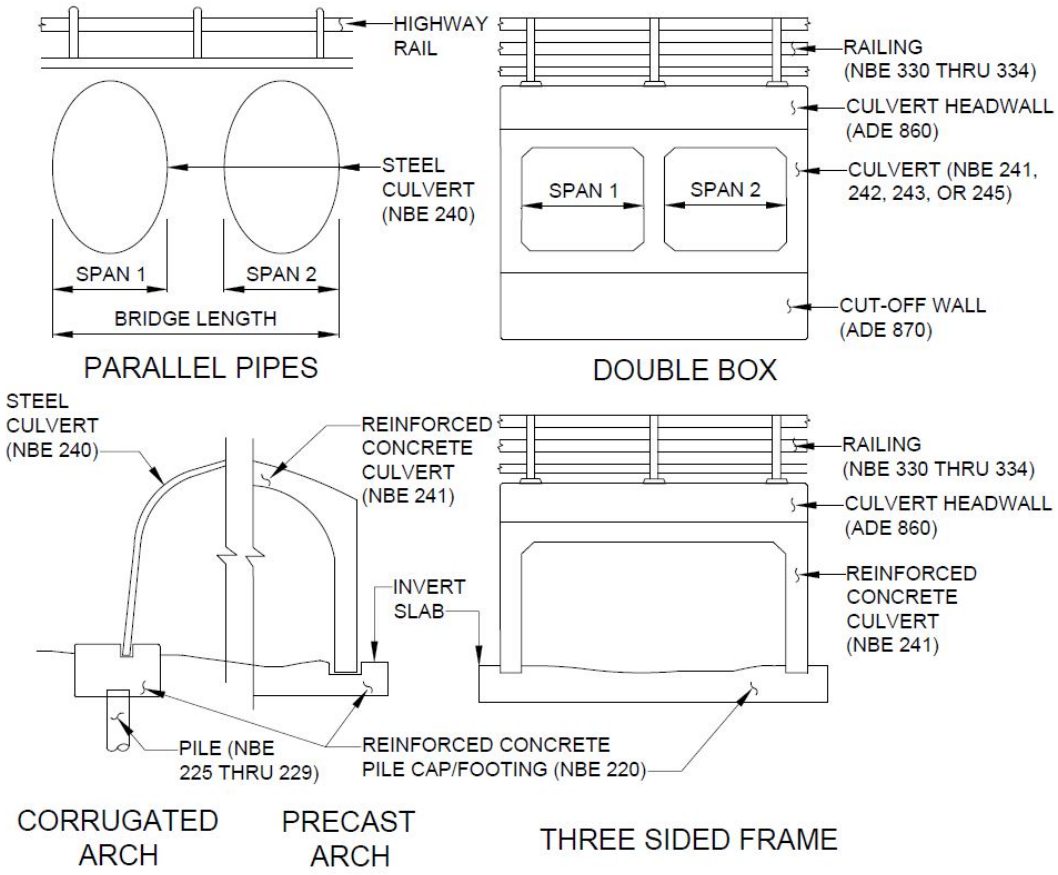


Figure 5-3: Culvert Inspections

Underwater

Most bridge failures are due to scour around the substructure foundations. The importance of underwater inspections cannot be overemphasized and should be diligently performed with appropriate detail.

Underwater inspections (UWI) are reported to the FHWA and are audited specifically by Metric #8, #9 and #17. All DOTD Districts must remain in compliance with the FHWA Metrics. A routine UWI will consist of a minimum intensity level of 100% Level I and 10% Level II. If the routine UWI is not conclusive than a Level II or Level III effort will be applied, only with prior approval from Headquarters Bridge Inspection Office. Intensity levels for Underwater Inspections below are referenced from the BIRM:

Level I Inspection:
A Level I inspection includes a close visual examination of the entire submerged portions of a bridge. Although the Level I inspection is often referred to as a "swim-by" inspection, it is to be detailed enough to detect obvious damage or deterioration. It should confirm the continuity of the full length of all members and detect undermining or exposure of normally buried elements. A Level I inspection is normally conducted over the total exterior surface of each underwater substructure element, whether it be a pier, abutment, retaining wall, bulkhead, or pile bent. In many environments, handheld lights are needed to make observations. A Level I inspection may also include limited probing of the substructure and adjacent channel bottom. Where water clarity is so poor that a diving inspector cannot visually inspect the structure, a tactile inspection is made and can be accomplished using systematic sweeping motions of the hands and arms to cover the entire submerged structure. The results of the Level I inspection provide a general overview of the substructure condition and verification of the actual construction with as-built drawings. The Level I inspection can also indicate the need for Level II or Level III inspections, and aid in determining the extent of, and in selecting the location of, more detailed inspections.

Level II Inspection:
A Level II inspection is a detailed inspection which requires that portions of the structure be cleaned of marine or aquatic growth. Cleaning in salt water and brackish water can be time-consuming and should be restricted to critical areas of the structure. In fresh water, aquatic coatings can often be removed with limited effort by wiping the structural element with gloved hands. For pile type structures, a 6-inch to 12-inch-high band—preferably a 10-inch to 12- inch-high band—should be cleaned at designated locations, generally near the low waterline, near the mudline, and midway between the low waterline and the mudline. On a rectangular pile, the cleaning should include at least three sides; on an octagonal pile, at least six sides; on a round pile, at least three-fourths of the perimeter; and on an H-pile, at least the outside faces of the flanges, one inside face of a flange, and one side of the web. Where a 10% Level II inspection is specified for a pile type structure, it is not the intention that 10 percent of the entire substructure be cleaned, but rather that 10 percent of the piles be cleaned in three 6-inch to 12-inch-high bands. On large solid-faced elements such as piers and abutments, one foot by one foot areas should be cleaned at three levels on each exposed face and end of the element. For a structure length that is greater than about 50 feet, it is general practice to clean an additional line at three levels on each exposed face. The selection of the locations for cleaning should be made so as to minimize the potential for damage to the structure, and should target, when possible, more critical locations. After cleaning, damaged areas should be measured, and the extent and severity of the damage documented. Level II inspections are intended to detect and identify damaged and deteriorated areas which may be hidden by surface biofouling or products of corrosion. The thoroughness of cleaning should be governed by what is necessary to discern the condition of the underlying material. Complete removal of all biofouling growth or corrosion products is generally not needed.

Level III Inspection:
A Level III inspection is a highly detailed inspection of a critical structure or structural element, or a member where extensive repair or possible replacement is contemplated. The purpose of this type of inspection is to detect hidden or interior damage, or loss in cross-sectional area, and to evaluate material homogeneity. This level of inspection includes extensive cleaning, detailed measurements, and selected nondestructive and partially destructive testing techniques such as ultrasonics, sample coring or boring, physical material sampling, and in-situ hardness testing. The use of testing techniques is generally limited

to key structural areas, areas which are suspect, or areas which may be representative of the entire underwater structure.

An UWI will typically summarize the structural condition of the bridge substructure materials below the high-water line only. UWIs will have additional requirements from routine inspections. must be completed by NHI certified and professionally trained commercial divers. Therefore, all underwater bridge inspection services will be conducted through consultant retainer contracts (overlapping five-year contracts) administered by the Headquarters Bridge Inspection Office.

UWI types are only documented as such when the inspection requires a diver to inspect structural components submerged in over 3.5 feet of water (during seasonal low stream flows) and/or that are otherwise inaccessible by wading and probing during routine inspections. **Any bridge with continually submerged timber or steel elements that may be difficult to tactically inspect below the waterline should be added to the UWI list.** For example, a timber pile may be in 2.5 feet of water with a soft or unstable bottom, hazardous wildlife may be present, and/or the approach bottom is unstable or over 3.5 feet deep. Please contact Headquarters Bridge Inspection Office for questions.

An UWI is also required for submerged culvert structures that are inaccessible during routine inspections. Underwater inspections of culverts typically consist of a “complete” inspection; however, it will not be coded as a routine inspection, but only as an UWI under Items 92B and 93B. These structures will be identified in the UWI list. See the culvert section above for further UWI details.

The UWI Team Leader must assess condition and depth of the streambed, determine the susceptibility of the streambed to scour, and determine what countermeasures can be taken to safeguard the bridge. The primary requirement is to establish a cross-section of the streambed. This is accomplished by sounding and can be carried out with either a fathometer (also known as a “fish finder”) or a lead line. If elements identified in the routine inspection report are found to be accessible without the need for a diver, these elements will still be inspected and recorded as described above.

Underwater inspection frequency is established in the NBIS as follows:

1. Inspect underwater structural elements at regular intervals not to exceed 60 months
2. Certain underwater structural elements require inspection at less than 60-month intervals. Establish criteria to determine level and frequency of inspection considering factors such as construction material, environment, age, scour characteristics, condition rating from past inspections, and known deficiencies.
3. Certain underwater structural elements may be inspected at greater than 60-month intervals, not to exceed 72 months, with written FHWA approval. This may be appropriate when past inspection findings and analysis justifies the increased inspection interval.

Note: Item 60 will be consistent with the one given in Item 113 whenever a rating factor of 2 or below is determined for Item 113.

A topside inspection NBI Item 60 condition rating of 4 or less will be reflected throughout the entire bridge

report. However, following an underwater inspection with an NBI Item 60 condition rating of 5 or higher, the Team Leader of the topside inspection can decide whether or not to reflect the underwater rating in the overall NBI Item 60 condition rating. Structures with UWI substructure or culvert condition ratings of 4 or less will require a Level III inspection. An increased frequency for underwater inspections will be based on the following unless the bridge is immediately repaired, or load posted:

Table 5-2: Conditions for Increasing Frequency of Underwater Inspections

SUBSTRUCTURE or CULVERT CONDITION RATING (FROM UWI REPORT)	MAXIMUM INTERVAL OF UNDERWATER INSPECTION
3-4	24 months
<2	12 months

The underwater inspection report will be completed in AssetWise and approved within 45 days of completion of the field work.

See the BIRM and the MBE for further guidance on performing Underwater Inspections.

Special (Interim)

Special inspections of On-System bridges will be performed by DOTD Bridge Inspectors and recorded in a dated inspection report in AssetWise. It should be determined if an inspection cycle will need to be applied (i.e. 6-month or 12-month) or not. Properly enter the inspection frequency and date that the special inspection was performed (if needed, the date of the next inspection if set on an inspection frequency).

Special inspections of Off-System bridges will be the responsibility of, documented and performed by, local jurisdiction bridge owners and/or their engineering staff. These inspections will be recorded in AssetWise and the owner's bridge files. The local jurisdiction bridge owner is responsible for setting the inspection staff qualifications.

The purposes/key features of the special (interim) inspection are as follows:

- To monitor a known or suspected deficiency
- Routine inspection cycle (frequency) is not affected
- Team Leader not required to be present
- Scheduled at owner's discretion within the schedule month
- Does not apply for underwater inspections

A special inspection is required if the following conditions exist, and there has been no increase to the routine inspection frequency:

Note: A routine inspection will satisfy a required special inspection, but a special inspection will not satisfy a required routine inspection. Therefore, if a routine and special inspection are required on the same date or at close intervals, a routine inspection must be performed.

Table 5-3: Conditions for Increasing Frequency of Special Inspections

LOAD CARRYING CAPACITY (TONS)	LOWEST CONDITION RATING (DECK, SUPER, SUB, OR CULVERT)	MAXIMUM INTERVAL OF SPECIAL INSPECTIONS
N/A	0-2	6 months
5 or Less*	3-4	6 months
10-15, 15-25, 20-35, 25-40, 30-44	3-4	12 months
10-15, 5 or less*	5-9	12 months
N/A	5-9	24 months

**If a bridge will not carry a minimum of 3 tons of live load, the bridge should be physically closed.*

Damage

A damage inspection is an unscheduled inspection to assess structural damage resulting from an accident, human action, or natural disaster/environmental factor. This report type will only be used for the initial assessment, with no inspection frequency and documentation of damage caused by an outside force. The local jurisdiction bridge owner is responsible for setting the inspection staff qualifications. Follow-up reviews should be entered as a special inspection. Damage inspections should include:

- Cause of damage
- Extent of damage to all bridge members with detailed measurements
- Photographs and sketches (include a shoreline sketch of both banks up to 200 feet upstream and downstream to show possible channel migration)
- Streambed profile, if applicable
- Accident report, if applicable
- Assessment of possible need to close or restrict traffic

In-Depth

An in-depth inspection is a “hands-on” method used to physically assess each bridge member for the existence of changes and the extent of deficiencies. It may require the use of nondestructive field tests and other material tests to identify deficiencies that are not readily detectable using routine inspection procedures. This is a specially assigned inspection and does not have a set frequency. This inspection type is often used to record the condition and geometric details for a load analysis or rehabilitation design. Specialized consultant contracts are sometimes utilized for in-depth inspections of major complex bridges and movable bridges. Other in-depth inspections can consist of assessments of bridge elements such as cable stays and dampeners, gusset plates, pin and hanger assemblies, acoustic crack promulgation testing, or ground penetrating radar (GPR) deck delamination testing and nondestructive load testing.

Complex Bridge

Complex bridges currently include major truss, cable-stayed, movable (bascule, vertical lift, swing, pontoon), and segmental bridges. Complex bridges are those bridges with complex load paths and/or special details that require specialized inspection training for Team Leaders and/or individualized routine inspection procedures. Each bridge type requires certain components to receive a more "hands-on" or "in-depth" inspection. Complex structures require an inspection of components that are unique to the type of structure.

Consultant led In-Depth Inspections of movable bridges must be performed in accordance with AASHTO *Movable Bridge Inspection, Evaluation Manual.* Movable bridges require inspection of all electrical and mechanical components. Electrical and mechanical engineers should assist in movable bridge inspections; their names will be included in the inspection notes. All movable bridges in the state consist of bascules, vertical lifts, swing, and pontoons. Half of these movable bridges are more than 50 years old. Agency-defined elements have been assigned for movable bridge inspections and can be found in Appendix A-17 of this Manual. Movable bridge electrical and mechanical components will be documented in the element rating data in AssetWise during routine inspections and during consultant-led in-depth inspections. Refer to Section 6.5 for further information regarding movable bridge inspections. A list of On-System and Off-System movable bridges can be found in Section 10 (see Appendix A-19).

Cable-stayed bridges receiving a consultant-led in-depth inspection will require special attention to components such as: cable stays, dampeners, anchorages, towers, and inspection travelers. Cable-stayed bridge components will be inspected in accordance with the Designer's Maintenance and Inspection Manual for that structure. Nondestructive testing will be performed on the cable stays to verify their condition.

Routine inspections for complex bridges in accordance with 23 CFR 650.313 (f) and Metric 19 that contain details or components requiring specialized equipment or evaluation techniques should annotate the required inspection process in the structure notes field in AssetWise. Notations made in the report should indicate the performance of the required inspection as well as the inspection results. For example, detailed procedures and time frames for inspections of stay cable strands on cable-stayed bridges and/or dampers should be provided. Therefore, each identified complex bridge must have the following minimum items noted within the "Structures Notes":

- Identification of complex features or features with unusual characteristics
- Inspection methods, specialized inspection procedures, and frequencies
- Additional qualifications/experience required of inspection personnel and/or qualification/experience for specialized personnel assisting in the inspection
- Other procedure items that would assist an inspection team to ensure a successful inspection

In-depth inspections of complex bridges will be performed on a regular basis by consultant contract for major truss, cable-stayed, and movable bridges to supplement (not replace) the information in the routine inspection.

Fracture Critical

A fracture critical member (FCM) is a steel member in tension (or with a tension element) whose failure would probably cause a portion of or the entire bridge to collapse. A FCM can also be reference as a Nonredundant Steel Tension Member (NSTM).

A fracture critical (FC) inspection consists of a hands-on inspection of FCMs or FCM components that may include visual and or other nondestructive testing. It is DOTD policy to inspect all bridges that have FCMs in accordance with 23 CFR 650.311. A qualified Bridge Inspection Team Leader must be present during a FC inspection.

The Fracture Critical inspection for DOTD On-System structures are to be performed concurrently with the routine inspection (EDSM IV.4.1.2).

A hands-on inspection is an inspection method within arm's length of the component, using physical visual techniques that may be supplemented by nondestructive testing. If a component requires a hands-on inspection, there is no substitute for a physical arm's length visual technique. Several inspection methods are regularly used to effectively complete a bridge inspection. The most common and least expensive methods include using ladders, chest waders, small vessels, and structure climbing equipment (harness and double lanyards or rope access). Other inspection methods could include using tools accepted by DOTD to **assist** as specialized inspection equipment or used only as **primary** reference and supplemental aids; acoustic imaging, ground penetrating radar, or unmanned aerial systems (UAS). If an area of concern is identified while interpreting the primary reference aids results, a physical visual technique will be applied. Inspection methods will be documented in the structure notes for planning purposes on subsequent inspections.

FC inspections must begin with advanced planning. 23 CFR 650.313(e)(1) requires all FCMs and the inspection procedures to be listed prior to any Fracture Critical inspection. An office review (with structural plans) should contain the following:

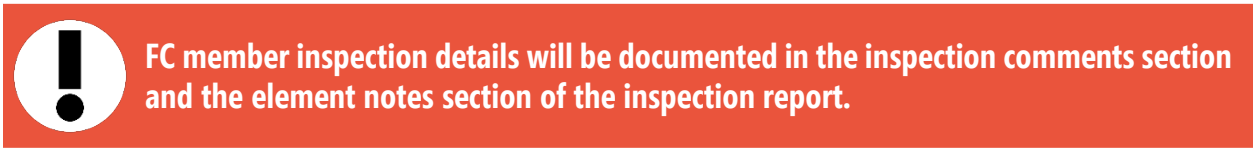
- Identify FC members
- Note members that may require special field attention, such as built-up tension members
- Plan means of access to the members
- Identify bridge specific tools and equipment necessary to perform the FC inspection, such as nondestructive testing tools, cleaning equipment, mirrors, paint pens, etc.

Field inspections will be conducted based on the member type and in accordance with the procedures stated in the *Fracture Critical Inspection Techniques for Steel Bridges*. Typical FCMs include:

- Steel girders and floorbeams
- Trusses
- Steel box girders
- Pin and hanger assemblies
- Arch ties
- Eyebars

- Cross girders/steel pier caps

DOTD Districts will not be responsible for performing inspections involving specialized nondestructive testing. In-depth inspections of this nature will be managed by the Headquarters Bridge Inspection Office. The ADA of Operations will submit a written request to the Headquarters Bridge Inspection Office when such testing is necessary. Specialized NDT does not include quick and cost-effective methods such as dye penetrant, which should be regularly used by inspectors in appropriate applications. Refer to *Nondestructive testing methods* in the following section for further details.



Required minimum documentation is as follows:

1. A statement in the element notes that identifies which member is fracture critical or contains fracture critical details. Include notation that a "**hands-on inspection**" was performed.
2. Location of FC member(s) on the bridge and method of access to the member(s) to facilitate a hands-on inspection.
3. Method of FC member inspection, such as visual and/or nondestructive testing; state type of NDT used.
4. Date of FCM inspection and inspector's full name.
5. Findings
    a. If no cracks/defects are found, state "no defects were found" in the element notes.
    b. If cracks/defects are found, record the following details:
        - General location of crack with respect to entire bridge and exact location on the member
        - Original dimensions and details of the member containing the crack/defect along with dimensions and details of modifications to the member
        - Date and weather condition when the crack/defect was first detected, confirmed by NDT, and reexamined on subsequent inspections
        - Label the member with date of inspection and initials of certified inspector using permanent marker or a paint pen (be sensitive to aesthetics of prominent areas)
        - Detailed sketch of crack that shows length, width, depth, and include photographs of crack preferably with a scale reference included
        - Noticeable conditions of crack when exposed to live load such as lengthening, opening and closing, and distortions
        - General condition at location of crack such as corrosion, dirt, debris, traffic impact, and steel type (if available)

A FC inspection is required at a frequency not to exceed 24 months. Inspection results are to be recorded in the inspection report using the inspection type *Fracture Critical*. When one of the criteria in Table 5-5 below is met, the ADA of Operations is to schedule a *Fracture Critical* inspection of affected members, as well as of other related details that may possibly be affected.

Table 5-4: Conditions for Increasing Frequency of Fracture Critical Inspections

DEFICIENCY DESCRIPTION FOR FCM	MAXIMUM INTERVAL OF FCM INSPECTION
Unarrested Cracking or >40% Section Loss	6 months
Moderate Arrested Cracking and >15% Section Loss	6 months
15-40% Section Loss and No Cracking	12 months
Moderate Arrested Cracking and 0-15**%** Section Loss	12 months

If an increased routine inspection frequency and an increased FCM inspection frequency are required at the same time, the FCM inspection will be completed and reported as part of the routine.

Additional information on FC inspection procedures can be found in the *MBE, Section 4.8*.

NDE Consultant Inspection

DOTD has recently added the Nondestructive Evaluation inspection type to AssetWise. There is no mandatory inspection frequency and this inspection type will generally be performed by consultants, as specialized training is often required.

The nondestructive field-testing results should be documented in the bridge file when appropriate. It should be considered that improved technology, innovations and testing procedures are rapidly evolving, so other sources may need to be referenced.

Below are several examples of NDE inspection types by material:

Timber

Nondestructive testing methods for timber include:

- Probing with an awl, pick or knife
- Sounding with a hammer
- Resistograph drilling
- Mechanical sonic pulse-velocity methods
- Moisture content meter
- Field ohmmeter
- Spectral analysis
- Increment borer

Concrete

Nondestructive testing methods for concrete include:

- Chain drags and hammers

- Schmidt Hammer and Windsor Probe for relative compressive strength
- Cover meters or pachometers or rebar locators
- Copper half-cell to measure corrosion potential
- Infrared thermography
- Ground-penetrating radar
- Mechanical sonic pulse-velocity methods
- Piezoelectric transducer

Steel

Nondestructive testing methods for steel include:

- Dye penetrant
- Ultrasonic testing
- Magnetic particle
- Eddy current
- Acoustic emissions testing
- Corrosion sensors
- Smart coatings
- Radiography testing
- Electrochemical fatigue sensor
- Laser vibrometer

Figure 5-4: UT on Steel Pile.
Source: Engineering Operations

Refer also to the *BIRM, Chapter 6* and the *MBE, Chapter 5* for further guidance.

5.5. Element Level Data Collection

In Louisiana, element level data collection (ELDC) began in 2005 with a mandate for all On-System bridges to be included in all reports.

ELDC is currently governed by the new first edition *AASHTO Manual for Bridge Element Inspection*, published in December 2013.

The most significant changes in ELDC are as follows:

- One of four condition states provided for all elements – good, fair, poor, and severe
- Deck and slab quantity changed to square feet
- Wearing surface separated from the deck element
- Protective coating separated from element
- Smart flags were incorporated in condition state language and operate at the element level
- Presentation of condition state defects is more intuitive

The three element types:

- National Bridge Elements (NBE): decks, slabs, beams, abutments, etc.

    - Define safety and load rating
- Bridge Management Elements (BME): joints, coatings, wearing surfaces, etc.
    - Secondary bridge components
- Agency Defined Elements (ADE): movable bridge elements

The ELDC breakdown for each NBE and BME is provided below and typically provides the element name, unit, and element number associated with the material type.

Inventory Direction and Numbering

The inventory direction and numbering of substructures of all bridges within the DOTD bridge maintenance program will be south to north or west to east in accordance with the roadway direction of increasing mile markers.

All substructure units that have associated piles, columns, caissons, or anything aside from pier walls will be inventoried left to right while looking in the direction of increasing substructure unit number, north or east. A description of the inventory direction and numbering system used will be included in the bridge inspection report under structure notes. In Figure 5-4, an aerial view of structure 009020 is provided. The inventory appears to be south to north using magnetic north but the route, SR 182 / I-90 BUS, is west to east.

All bridge elements will be numbered from left to right in the direction of inventory. If this numbering system is not practical or possible, a detailed sketch and description of how the substructure units were counted will be included within the submitted report.

Movable swing arm piers (pivot piers) will be numbered in accordance with the inventory direction and numbering guidance above. A common numbering scheme for circular pile patterns is to start in the center of the bridge at the nearest pile (Pile #1), then looking in the direction of inventory proceed clockwise, numbering each pile from outside to inside. Sketches will always be provided with pivot pier configurations.

Figure 5-5: Inventory Direction Example

5.6. Condition States & Associated Defects

Once the NBE and BME have been identified and an overall quantity for each has been established by means of reviewing as-built drawings and field verification, defect types and associated condition states can be assigned to these elements. The condition state is defined by four categories and includes good (CS1), fair (CS2), poor (CS3), and severe (CS4). The *AASHTO Guide Manual for Bridge Element Inspection* identifies (in detail) the defect associated with each NBE and MBE and provides guidelines to the inspector for determining the defect severity as well as an additional element commentary for the inspector to take under advisement during their evaluation.

5.7. Overlapping Defects

Defects will often overlap. The most obvious case is where two defects occur in the same place, such as a crack and spall within the same footprint of the element. To provide an accurate representation of the inspection findings, we cannot count this 1-foot area twice and need to represent which one would result in the worst rating. For instance, if there is a Condition State 3 spall and a Condition State 2 crack, the Condition State 3 defect (spall) should be represented in the ELDC table. In many instances, several defects

may be within the same footprint and fall into the same Condition State. In this case, the inspector must decide which defect dominates.

5.8. SI&A and Non-SI&A Field Coding

SI&A data has been developed for all DOTD bridge structures based on the FHWA's *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*, with additions and modifications as developed by DOTD. The DOTD *2017 Recording and Coding Guide* will be used to update any SI&A items that have changed since the last inspection.

SI&A data will be reviewed prior to each inspection and taken into the field to verify critical measurements.

Items that require changes should be clearly marked on the forms/tables and included with the inspection reports. A Bridge Inventory Form will be submitted with a change to SI&A inventory data.

Refer to Section 7.3 regarding report procedures. Refer to Section 9 for a link to the DOTD *2017 Recording and Coding Guide*.

5.9. Delayed Inspections

Should an inspection be delayed due to "unusual circumstances", FHWA may—after a review of specific requests—issue a waiver for up to a 30-day grace period. FHWA defines "unusual circumstances" as "…severe weather, concern for bridge inspector safety, concern for inspection quality, the need to optimize scheduling with other bridges, or other unique situations…." Every effort should be made to avoid a delay in the scheduled inspection. Should this occur, the following steps must be taken for proper documentation:

1. As soon as practical, and preferably prior to the inspection(s) becoming delinquent, email the Headquarters Bridge Inspection Engineer with details on which bridges will be delayed, the specific "unusual circumstance" causing the delay, and expected date of actual inspection.
2. The Headquarters Bridge Inspection Engineer will make a formal request to FHWA for approval of any inspections that are delayed past the 24th month for all district offices and forward the approval(s) back to the districts.
3. Upon completion of the inspection, the inspector will document the specific cause for every inspection delayed past the 24th month, regardless of FHWA's approval (i.e. "the bridge site was in a hurricane damaged area that was inaccessible for 3 weeks" – not just "severe weather" or "Hurricane Isaac").
4. Where FHWA has approved the delay of inspection into the 25th month, the letter of approval will be attached to the inspection report media content and annotated within the report's inspection notes.

It should be duly noted that any inspection performed past the 24th month for routines or the 60th month for underwater will count against the department's compliance with NBIS Metrics 6 & 7 or 8 & 9. Only

those delayed inspections that received a concurrence from FHWA for an "unusual circumstance" AND were inspected no later than the 25th or 61st month will be exonerated from the tally during the compliance review.

Every effort will be made to inspect each structure in the month the inspection is due. At a minimum, inspection of the structure should be started prior to the end of the month and documented with associated field notes and photos to show the inspection start date. However, if a structure becomes overdue, immediate action will be taken to inspect the structure and the reason for the inspection being overdue documented.

As soon as it is known that an inspection is expected not to be performed within the month due, the reasons for the late inspection must be submitted to the District Bridge Engineer for notification of the FHWA to be considered for an unusual circumstance waiver.

5.10. Safety Features

Safety features are coded as NBI Appraisal Item 36. All traffic safety features at a given bridge will be inspected to meet current standards according to the latest design criteria.

Four basic safety features are designed to satisfy agency standards, which specify acceptable heights, material, strengths, and geometric features:

- Bridge rails
- Transitions
- Approach guardrail
- Approach guardrail ends

Other typical safety features can include, but are not limited to:

- Pedestrian rails and fencing
- Sidewalks and curbs
- Signing (weight limit, advanced posting, object markers, and clearance)
- Lighting (drawbridge lights, navigation lights, and traffic control gate/lights)
- Connections

A safety feature deficiency may result in a critical finding, with immediate action required.

Refer to the *FHWA BIRM, Section 7.6* for more details on safety features.

Ancillary Structures Attached to a Bridge

Ancillary structures that are included in a routine bridge inspection are sign panels, sign frames, lights, or other attachments that may present a safety hazard to the traveling public if the connection fails. The overhead sign truss structures that are attached to a bridge will be inspected under an independent consultant contract.

5.11. Timber Elements

For all timber bridges or bridges with timber spans, a Timber Rating Form must be completed by the District Bridge Inspectors and submitted with the original add sheets for the structure.

Select the span where the associated bents will represent the worst deteriorated condition or, if the element's condition and dimensions seem the same, select a span representative of the element observed conditions. A sketch will identify the span and bent used to gather the information along with identifying specific location(s) of all deterioration or other substandard conditions.

As part of the field bridge inspection process for timber bridges, a copy of the latest Timber Rating Form (and computer output) will be reviewed to determine if the currently calculated load-carrying capacity for that timber bridge span(s) is consistent with the currently observed condition of the structure.

A new Timber Rating Form (Appendix A-14) will be prepared if:

- The bridge elements are observed to be in a worse condition (e.g. additional deterioration is found, or repairs have been made to the structure).
- The date of the previous timber rating is more than four years old.

If the current condition of the structure has not changed and the rating is not more than four years old, the date of the latest Timber Rating will be checked and **noted** in the inspection comments of the report.

The new Timber Rating Form(s) will be attached to and become part of the regular bridge inspection report for that bridge and submitted to the Headquarters Bridge Inspection Office through normal channels.

Refer to Section 7.11 for guidance regarding Timber Ratings.

5.12. Gusset Plates

The FHWA released a technical advisory on January 29, 2010, noting the importance of proper gusset plate inspections following the collapse of the I-35W bridge over the Mississippi River. Ultrasonic testing will be performed by trained technicians when significant corrosion is evident. The training level will be appropriate to the complexity level of the connection.

Typical areas of deterioration are found around pockets that hold debris and moisture. Debris should be removed to facilitate inspection. Pack rust can also occur between plates of built-up members and cause large internal forces. If buckling or cracking is evident, properly document the defect with photographs and contact the District Bridge Engineer immediately. Refer to Section 5.17 for communicating critical findings.

5.13. Streambed Field Documentation

All bridges over waterways [rivers, creeks, drainage areas, floodplains (wet or dry)] require streambed profiles as part of the regular bridge inspection process. Refer to the *Manual for Bridge Evaluation* (MBE) Second Edition – 2011, Section 2.4.1 (2). A streambed profile will be taken during every routine inspection except for scour critical bridges and bridges with Plans of Action (POA), which are required during every bridge inspection type. All profiles are to be recorded in a dated inspection report and uploaded into the AssetWise system.

A set of streambed profile readings will be plotted on a profile drawing of the structure showing the original stream bottom elevations and lengths of all piling. Always note the reference feature the readings were taken from (i.e. top of rail, top of cap, etc.). The locations of profile readings are measured from the beginning of the bridge in the direction of inventory. Elevations of the bottom of the stream will be plotted in red on the profile drawings.

The streambed profile is normally accomplished manually, by dropping a weighted tape from the bridge deck at uniform intervals, beginning at the abutment and each bent. Generally, measurements will be taken as a minimum as follows (other intervals are allowed as long as their distance is properly referenced):

- Along the upstream fascia of the bridge
- Along the downstream fascia of the bridge
- At every bent
- At mid-spans if span lengths are longer than 50 feet
- At points where the Bridge Inspector suspects a change in profile

For a single span structure, a total of 5 profile readings are required; 1 at each abutment, 1 at each quarter point, and 1 at midspan. The maximum distance between elevation readings measured along the roadway will not exceed 25 feet. For example, a 100 foot-long span will have readings at each bent/pier support and a reading at 25 feet, 50 feet, and 75 feet. This is the minimum number of elevation readings required, but more can be taken if needed or warranted. The bridge inspector will use best judgment and discretion when deciding measurement intervals.

Underwater inspections will also include 25-foot offset measurements, upstream and downstream of the bridge fascia.

Drawings will also include the length of the pile in each bent or under each footing (obtained from the plans), the elevation of the bottom of the cap, and elevation of the deck. If a plan sheet profile is used for this purpose and any of these dimensions are not shown, these dimensions must be added to the profile drawing.

For major bridges over large waterways where a weighted tape (or other easily deployable measurement system) is impractical, hydrographic surveys will be performed periodically by the Location & Survey Section. The District ADA of Operations is provided copies of these hydrographic surveys for review and filing. An electronic version of the hydrographic surveys will be added to AssetWise as they become

available and must be included in the inspection records by reference. Bridge Inspectors will note the following on all bridge inspection reports:

- If a hydrographic survey is on file and the date of the latest survey
- The fact that they have reviewed the survey
- Any problem or lack thereof indicated by the survey

Supplemental hydrographic surveys will be performed by the Bridge Inspectors via boat and lead line or sonar at any time there is a question or concern regarding scour. Critical and/or unusual conditions or findings may warrant a supplemental field survey by the Location & Survey Section's Hydrographic Survey Team. District Bridge Inspectors and/or the District Bridge Engineer will initiate such requests to the Location & Survey Section when deemed necessary.

Scour critical bridges and bridges with unknown foundations will have the POA reviewed and a streambed profile performed during every inspection (regardless of type). The cross-section will be recorded and compared with the previous profile and any critical elevations noted in the POA. The results of the comparison will be documented in the inspection notes. If the channel bottom at a bridge falls below a critical elevation noted in the POA, DOTD is to be notified immediately per the critical finding protocol.

Inspections Following a Storm Event

As flood events occur, the bridge should be monitored during and after a flood. If deemed safe, collect streambed profiles; this monitoring process will capture real-time live bed scouring. Undermining may be visible before waters recede and drop loose sediment back in the scour hole. The monitoring program should be in accordance with the POA (if one is available) and the scour criticality of a bridge. Refer to Appendix A-8, A-9 and A-10 for documentation forms.

Other items to visually observe and document:

- Debris accumulation
- Damage to piles
- Span alignment
- Bridge rail alignment
- Approach slab undermining
- Approach roadway wash-out or undermining
- Approach slope erosion
- Need for traffic restriction

5.14. Monitoring Scour and Plan of Actions

All bridges (both On-System and Off-System) that have been issued a POA in accordance with the NBIS will be closely monitored during times of flood and high-water flow until the flow subsides.

For On-System bridges where known scour may contribute to the possible collapse of the bridge, the bridge will be closed to traffic until the situation is evaluated and stabilized. Refer to bridge closure procedures in Section 5.18. In cases where drift presents a potential threat to the lateral stability of the

bridge, the District will remove the drift when feasible or close the bridge until the problem has been corrected.

For Off-System bridges where known scour may contribute to the possible collapse of the bridge or where drift presents a potential threat to the lateral stability of the bridge, the District Bridge Engineer and the bridge owner will be notified in accordance with Section 5.17.

Written procedures for a monitoring plan will be developed by the Headquarters Bridge Inspection Office, listing all On-System and Off-System bridges with known or suspected susceptibility in the event of a flood. Bridges with an active POA will also be included on this list. The monitoring plan will assign responsibility for monitoring each bridge to a specific DOTD office (i.e. Parish Superintendent, Maintenance Specialist, Project Engineer, Bridge Inspector). The monitoring plan will be updated should a bridge be added to or removed from the monitoring plan or where a change in DOTD organizational structure necessitates an update. The updated monitoring plan will be submitted annually (in December) to the Headquarters Bridge Inspection Office.

A copy of the monitoring plan will be provided to each District Bridge Inspector and DOTD office with assigned responsibility. A copy of the monitoring plan will also be kept in the District Bridge Inspection office along with any written procedures (and forms) of how documentation will be carried out in case of an event.

A POA has been created for each bridge categorized as scour critical (SI&A Item 113 = 0, 1, 2, or 3) and as having unknown foundation (SI&A Item 113 =U). These POA documents are housed on the network bridge files (in future in Content Manager or AssetWise, or both) in each bridge's respective miscellaneous folder. Additionally, they must be housed in a hard copy folder in each District, labeled "Scour Critical POAs" and should be referred to immediately during times of flooding or high water events.

Monitoring of these bridges will include a special inspection report following high flows where the streambed profile will be taken and compared with the previous profile on record in the District Bridge Inspection files to ascertain if additional scouring has occurred. The special inspection, along with any Scour Highwater Inspection Form, will be entered in the AssetWise system by the bridge inspectors with the current streambed profile information. Inspectors will complete the Scour Highwater Inspection Form (Appendix A-9) to provide official documentation of required monitoring during and following a high-water event.

5.15. Bridge Posting

All bridges must be rated as to their safe load-carrying capacity, and bridges are posted when the maximum unrestricted legal loads or State routine permit loads exceed those allowed under the operating rating or equivalent rating factor. Load posting of bridges is considered a deficiency and proper weight limit signage observation should be documented during every inspection. Proper documentation includes

written notation of the posted limit observed and displayed versus the required posting as listed in the SI&A on the date of inspection. Photographic proof of posting (and advanced posting) is strongly recommended in every field site visit as these signs are frequently vandalized.

Louisiana can only remain in compliance with federal regulations (regarding bridge postings) if the bridges are properly posted and all associated deficiencies are promptly addressed.

DOTD and local bridge owners are responsible for installing and maintaining weight limit signs at each bridge approach of bridges that require weight limit signs under their jurisdiction that is not capable of carrying the full legal load allowed by Louisiana law.

For locally owned bridges, load limit regulations should be established by an official act of the local governmental body to be legally enforceable.

Local bridge owners are expected to have a system in place to maintain and replace signs if necessary.

For compliance purposes, a properly posted or restricted bridge is defined as follows:

1. The required weight limit posting as determined by a load rating analysis is reflected at the bridge structure by installation of load posting signs.
    a. If the owner desires, a lower load limit may be selected and posted. DOTD must be notified and the bridge inventory data updated.
    b. A bridge will not be posted at a higher load limit than the maximum required weight limit; if encountered, this should be categorized as a deficiency.
2. Weight limit posting signs must comply with the Manual for Uniform Traffic Control Devices.

In accordance with the FHWA Memo *Timeframe for Installing Load Posting Signs at Bridges*, dated April 17, 2019, and it's the bridge inspection program policy that "bridge load postings are to be made as soon as possible but no later than 30 days after a load rating determines a need for such posting."

Requirements for changes in postings will be in accordance with Section 7.12. Also refer to the *Traffic Engineering Manual, Section 2B.4 "Use of Weight Limit Signs."*

Weight Limit Sign Inspection Procedures

All signs are inspected by the DOTD District Sign crews on a monthly basis. However, bridge inspectors may also document weight limit signs in the following ways:

- Refer to Table 5-6 for the required weight limit signs and record the loads posted on site.
- Photograph the bridge approaches to include each weight limit sign. These photographs will show the sign, its post, and the adjacent roadway; a close-up of the front face of the sign; any issues affecting the sign.
- If a required weight limit sign is missing at a bridge approach, a photograph should be taken to illustrate the deficiency. Note that it is a critical finding if a weight limit sign is missing.

Weight Limit Reporting Condition Data

For a bridge that requires posting, the posting load is reported on the bridge inspection report in the posted load field as shown in Table 5-6 (also refer to EDSM No. I.1.1.8). The Bridge Inspector will obtain the required posting on the date of inspection; for On-System bridges and Off-System bridges the required posting is available in AssetWise.

Table 5-5: Bridges Requiring Posting

CATEGORY	SIGN TYPE	WEIGHT LIMIT
1	R11-2	Closed
2	R12-1	03T Gross
3	R12-1	05T Gross
4	R12-5	10T Single Unit Truck – 15T Combination Truck
5	R12-5	15T Single Unit Truck – 25T Combination Truck
6	R12-5	20T Single Unit Truck – 35T Combination Truck
7	R12-5	25T Single Unit Truck – 40T Combination Truck
8	R12-5	25T Single Unit Truck – 44T Combination Truck
9	R12-5	30T Single Unit Truck – 44T Combination Truck
10	R12-5	35T Single Unit Truck – 44T Combination Truck
11		No Limit Required

Posting Locations

The typical bridge posting locations are shown in the schematics below:

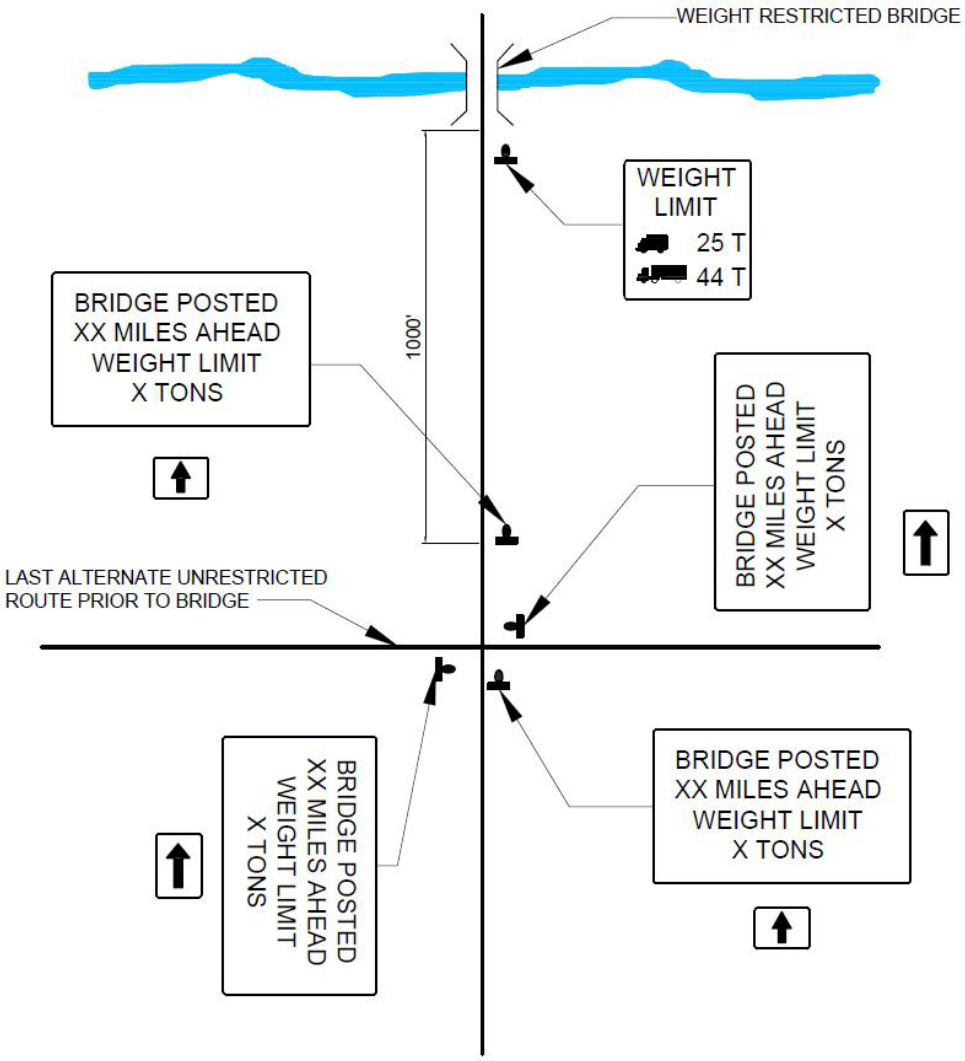


Figure 5-6: Bridge Posting Location Diagram

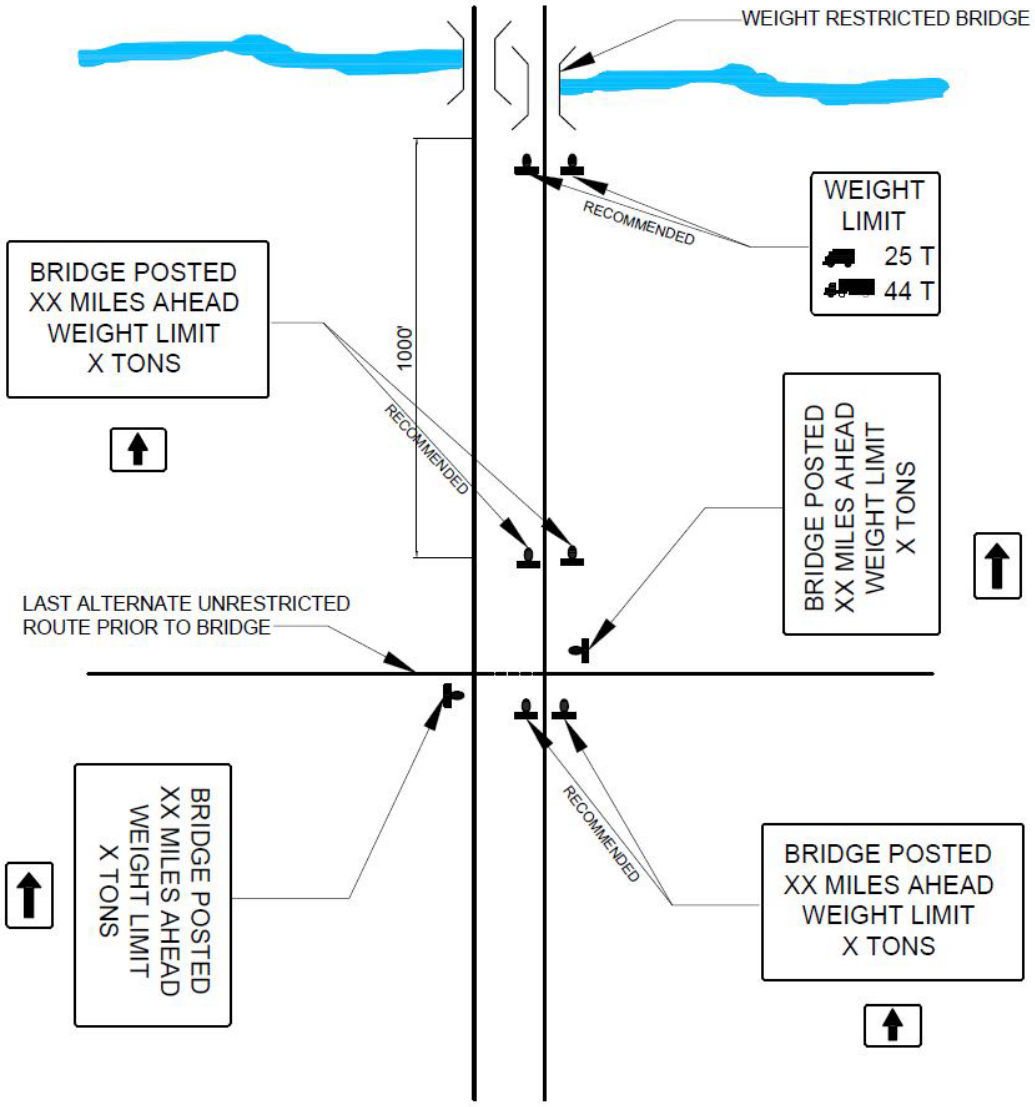


Figure 5-7: Bridge Posting Location Diagram

Observed School Bus or Truck Traffic Violations

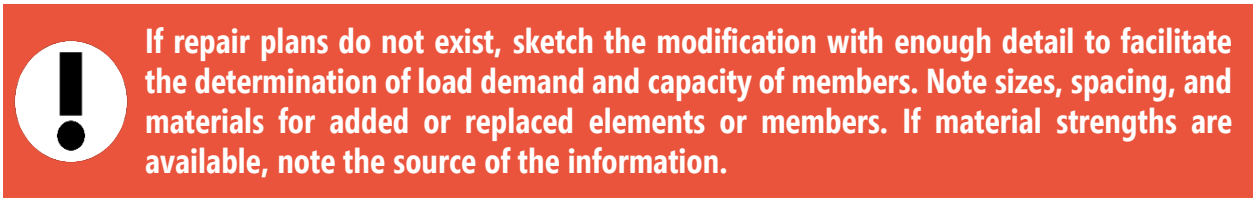
Districts should maintain a list of agencies to contact for observed violations of weight limit posting. It is recommended to photo-document violations, if possible, during a field inspection.

5.16. Collection of Data for Load Ratings

A primary reason to inspect a bridge is to form the basis for the evaluation and load rating that reflects the present condition of the bridge. Condition changes that affect capacities and loading demands on members are relevant inspection report data for load rating. Condition changes include, but are not limited to, the following:

- Primary member condition rating has changed
- Dead load has changed due to resurfacing, alterations, and additions. Typical items include modification of barriers and addition of utilities
- Section properties have changed due to deterioration, rehabilitation, re-decking, or other alterations
- Damage due to vessel or vehicular impacts
- Cracking of primary members
- Losses at critical connections

For changes to bridge members or structure configuration, check with the Bridge Maintenance Department for repair plans in the bridge file.



Where present, note key materials and dimensions necessary for the dead load to be properly applied in the load rating analysis. For utilities, field-verify and note the type of utility; number, size, and material of pipes or conduits; and member sizes, spacing, and materials of utility supports. If the fill depth has changed or is not noted in the previous inspection reports, field-verify and note the fill depth and method of field verification. If the wearing surface thickness has changed or is not noted in the previous inspection reports, field-verify and note the wearing surface average thickness. Wearing surface thicknesses are highly variable, so multiple measurements at curbs and the roadway centerline should be used to determine an average wearing surface thickness. Note the method of average wearing surface thickness field verification and locations for thickness measurements.

For a deteriorated member section with loss, document the measured remaining section (as well as the original section) rather than assigning a visual estimation of the percentage of section loss. Sketches documenting the remaining section of components will include sufficient detail to facilitate the determination of the member's remaining load capacity. Section losses to reinforcing bars will be converted to a percent loss by the load rater. For example, sketches or descriptions of the remaining section should not note the remaining diameter if the remaining section is not the product of a uniform

loss all around the reinforcing bar. The length and location of deterioration along the length of the member will be noted as a distance measured from a common location (note common location, preferably the nearest centerline of bearing, such as 3 feet long starting 6 feet from the Abutment A centerline of bearing).

5.17. Critical Findings

A critical finding is defined when any of the NBI Items 58, 59, 60 or 62 is rated a 2 or below, when a "critical deficiency" is identified, or when a weight limit sign is not properly displayed or missing. A critical finding is essentially a structural or safety-related deficiency that requires immediate follow-up action or close monitoring until appropriate corrective action can be performed.

23 CFR 650.309 requires that critical findings be documented along with any follow-up actions and that a process be implemented for periodic notification/updates to FHWA.

All bridge inspection program critical findings will be documented in accordance with the procedures below, and their status will be monitored closely by the ADA of Operations and/or the District Bridge Engineer until resolved with periodic updates.

All bridge inspection critical findings will be monitored closely by the ADA of Operations until resolved with periodic updates as required below. The DOTD District ADA of Operations will be responsible for the implementation of the documentation process and the Headquarters Bridge Inspection Office will be responsible for the implementation of the reporting process (refer to Section 7.4 of this Manual). The Headquarters Bridge Inspection Office will be responsible for preparing a report with new findings or any updates to be submitted to FHWA during the first week of each month.

Critical Deficiency Protocol

Critical deficiency is a deficiency that may cause, or result in, the imminent collapse of a bridge. A critical deficiency will be reported during the monthly critical finding reporting process.

A critical deficiency is one that may require immediate roadway bridge restriction or closure for a period of time (other than for inspection activities) until the deficiency can be reviewed further or if prompt recommended corrective action or repairs are not made. Bridge inspectors have the right to make the determination to immediately restrict highway traffic of the bridge or temporarily close the bridge, if deemed unsafe and/or in danger of collapse (refer to Section 5.18). When this occurs, proper immediate notification of officials (bridge owner and/or local law enforcement entity) will be made.

It is DOTD's policy to protect the traveling public and the public's investment in bridge structure as well ensuring that immediate action is taken by the Bridge Owner upon receipt of information identifying possible critical deficiencies in bridge structures. The required action might be to restrict the load or close the bridge to vehicular traffic.

When an On-System bridge is determined to be in danger of collapse, the District ADA of Operations will be notified by the District Bridge Engineers and Bridge Inspection Supervisors and will notify the Headquarters Bridge Inspection Office immediately by phone and email.

The District ADA of Operations will make the determination if or when to notify the Transportation Department of the School Board for the Parish where the bridge is located.

When an off-system bridge is determined to be in danger of collapse, the Bridge Owner, Transportation Department of the School Board for the Parish where the bridge is located, District ADA of Operations, HQ, and Bridge Maintenance & Inspection Supervisor will be notified immediately by phone and email.

Once the bridge has been closed, the Owner's Engineer will evaluate the bridge and condition data provided by the Bridge Inspector to determine the action to be taken by the Bridge Owner. The Owner or Owner's Engineer will notify the DOTD District ADA of Operations within seven calendar days of the original notification that a critical deficiency requiring immediate attention exists to explain the actions taken by the Owner pursuant to the recommendation.

Compliance with the NBIS is determined annually by the Parish. All bridges on local roads and city streets (not owned by a state department or federal agency) within the boundaries of each Parish will be used to determine compliance with the NBIS. Compliance will affect the Parish's participation in the DOTD/FHWA Off-System Bridge Replacement and Rehabilitation Program. Failure to respond to a DOTD notification of critical deficiency and provide an acceptable response will result in non-compliance for the Parish in question.

If a critical deficiency is found during any type of inspection by a bridge inspector, the DOTD District Inspection staff must be notified according to the procedures herein.

A written plan procedural will be developed by each District using the *Critical Finding Form* in Appendix A-12 to list appropriate officials, telephone numbers, email addresses, and names of individuals to be notified when bridges are found to be in imminent danger of collapse. The plan will be verified and updated once a year or when there is a change of local government officials or change in DOTD organizational structure. The verified/updated plan will be submitted annually (in December) to the Headquarters Bridge Inspection Office. A copy of the verified/updated plan will be provided to each District Bridge Inspector, uploaded to the bridge file in AssetWise, and a copy of the plan will be stored in the District Bridge Inspection Office.

When a DOTD bridge inspector determines a bridge to be in imminent danger, the Critical Finding Form will be sent to the Bridge Owner by email. The Bridge Owner should immediately acknowledge receipt of the email by responding that it was received (as proof that the email was received). Copies of the Critical Finding Form and emails will be placed in the bridge file. In addition, a letter with a copy of the Critical Findings form provided to the Owner and a map showing the bridge location will be sent to the

Transportation Department of the local School Board. A copy of the letter and map will be placed in the bridge file.

The Owner must respond with an acceptable response to remain compliant with the NBIS.

The procedures to be followed are defined as:

- Off-System bridge recommended for closure
- Off-System bridge recommended for load posting
- Owner review of rating, posting, and closing data and requirements
- Monitoring Off-System Bridge Owner compliance with the NBIS by DOTD

Any response other than one of the appropriate responses, non-action, or no-response within the first seven calendar days after the original notification will place the Owner on formal notice of pending non-compliance with the NBIS. Upon expiration of the initial seven calendar day time period, the DOTD District ADA of Operations will give the Owner final notification via a certified letter and in person that a formal, irrevocable notice of non-compliance with the NBIS will be issued unless an acceptable response is received by the DOTD District ADA of Operations within seven additional calendar days**.** If an acceptable response has not been received after the first 14 days, the Parish will be in non-compliance with the NBIS and barred from participating in the joint FHWA/DOTD Bridge Replacement & Rehabilitation Program for at least one calendar year. The DOTD District ADA of Operations will notify the Parish of non-compliance with the NBIS by certified letter.

If the Owner's submittal satisfies the requirements of acceptable responses listed in the procedure, the Owner will be notified by phone or in person, followed by a letter confirming that the Owner's response is acceptable to remain compliant with the NBIS. The DOTD District office will forward the package (Owner's inspection report, load rating calculations, letters) with a cover letter to the Headquarters Bridge Inspection Office.

If the Owner's submittal does not satisfy the requirements for acceptable responses listed in the procedure, the Owner will be notified immediately, by phone or in person, followed by a certified letter. The Owner will be notified that an acceptable response must be received within 14 calendar days from initial notification to close or load post the bridge, or the Parish will be non-compliant with the NBIS.

Prior to re-opening or increasing/removing the posted load limit of any such bridge, the bridge will be inspected, and load rated by the Owner's Engineer. A new bridge inspection report and new calculated and stamped load capacity ratings will be submitted by the Bridge Owner or Owner's Engineer to the DOTD District ADA of Operations.

5.18. Bridge Closure Procedures

Closure is defined as the placement of a physical barrier that prevents vehicular access until a bridge is removed, repaired, or replaced. If a DOTD routine inspection uncovers a situation requiring immediate bridge closure because of imminent danger to the public, the Bridge Owner must be notified. Bridge

Inspectors may need to physically block/stop traffic to protect the traveling public**.** The Owner should immediately evaluate the situation and take necessary steps to safeguard the traveling public. On-System bridges are not considered to be "closed" with dirt piles.

When an On-System bridge is out of service, it is Department policy to continue to perform routine inspections until the bridge is repaired/replaced and reopened to traffic. During the closure, the bridge site will be inspected by DOTD Bridge Inspectors as part of the routine inspection cycle. Bridge inspection reports will be prepared and transmitted through AssetWise, providing the current condition ratings and record of the present situation.

For compliance, all bridges requiring closure will be field-reviewed. Any bridges not properly closed will result in non-compliance status for the Parish in the DOTD/FHWA Off-System Bridge Replacement and Rehabilitation Program, with no exceptions.

Any change to the open/closed status of a structure requires Bridge Inventory Forms to be submitted within 90 days of the date of status change by the District Bridge Engineer.

Off-System

Local Bridge Owners are responsible for closing any bridge under their jurisdiction that has been recommended for closure by DOTD or rated for a load-carrying capacity of less than 3 tons.

When an Off-System bridge is out of service for an extended time (five years), and the Owner has not included the bridge in their priority list for the federally funded DOTD/FHWA Off-System Bridge Replacement and Rehabilitation Program (which indicates a low priority/need for the bridge to be replaced), the bridge will be deleted from inventory. If a bridge is removed from the inventory, it will no longer be eligible for consideration under the DOTD/FHWA Off-System Bridge Replacement and Rehabilitation Program. Any entity with an internal established bridge replacement and rehabilitation program need to provide documented proof to the Headquarters Bridge Inspection Office that the bridge is in their program priority list and work will take place within a specific time frame.

Prior to deletion from inventory, the Owner will be notified by the District Inspection Office and given 30 calendar days to respond in writing with any intent to keep the bridge in inventory. The response must justify the bridge's significance/importance to the highway system and why it has not been submitted for inclusion in the Parish priority list within the last five years. Maintaining a closed/out-of-service bridge within inventory for longer than five years must be approved by the FHWA division office with concurrence by DOTD.

Any change to the open/closed status of a structure requires Bridge Inventory Forms to be submitted within 180 days of the date of the status change, in accordance with ESM IV.4.1.2.

CHAPTER 6:
UNIQUE CASES

CHAPTER 6. UNIQUE CASES

6.1. REPAIR DOCUMENTATION

For repairs to bridge elements or rehabilitation to multiple elements, bridge inspectors should determine the following:

- Repairs made since the previous inspection
- Age of the repair
- Deterioration of the repair
- General adequacy and functionality of the repair
- Permanent repair or temporary repair

Inspections Coinciding with Repair, Rehabilitation, or Replacement

Bridges being replaced and permanently closed to traffic, but still in AssetWise, require an inspection record with photos to document adequate bridge closure installation and signs. Once the replacement bridge is open to traffic, an inventory and initial inspection type will be performed, and the old bridge file will be historically archived within the archive folder and AssetWise.

Bridges temporarily closed to traffic for major rehabilitation require an inspection record with photos to document adequate bridge closure signs. A routine inspection type should be performed to document work performed upon completion of the work and prior to the bridge going back into service.

The inspection cycle will continue for bridges partially or completely closed to traffic for a structural repair by contract. Document adequate bridge closure signs with photos and categorize the repair as *temporary* or *permanent*. For temporary repairs, all previous defects and ratings will be carried forward. Sketches with a numbering scheme will be provided. A special inspection may be needed immediately following a structural repair and prior to reopening a bridge to the traveling public. The District Bridge Engineer will facilitate the special inspections with the project manager.

If a temporary detour bridge is constructed associated with a bridge contract project, the contractor is responsible for inspection of the bridge and maintaining it in a safe condition. A contract associated temporary detour bridge will not be part of the bridge inspection program.

Precautions should be taken to identify unusual hazards and develop a plan to mitigate those hazards. Prior to performing the inspection, communicate all bridge inspection operations to the Construction Foreman or Project Engineer on site.

Refer to Section 7.8 for further direction.

6.2. RAILROADS

For bridges over a railroad with a vertical clearance of 25 feet or less, Inspectors will determine the minimum vertical clearance from the top of each rail to the underside of the low chord of the superstructure. Each minimum vertical clearance documented will have an approximate location in relation to the bridge. Inspectors will produce a simple sketch showing a plan view of the bridge to locate all railroad tracks in relation to the bridge.

Notify the District Bridge Engineer at least ten (10) business days in advance of work where any person or equipment will be within 25 feet horizontally or vertically of the railroad track. A railroad flagger may be necessary if the inspector needs to be within 25 feet of a railroad track. The railroad companies may provide the flaggers. Inspectors entering a railroad right-of-way may be required by the railroad companies to complete Roadway Worker Protection Training. The District Bridge Engineer or Bridge Inspection Supervisor will coordinate with the appropriate Railroad Representative to determine the need for a flagman and any special protective safety measures.

6.3. RAMP BRIDGES

Ramp bridges connected to mainline bridges are oriented such that the beginning of the ramp bridge is at the mainline bridge. Refer to the Figure 6-1 sketch below that shows an example of “direction of inventories” for ramp bridges.

If the beginning of the ramp bridge is supported by a pier that also supports a part of the mainline bridge, only the bearings supporting the ramp structure will be assessed with the ramp bridge.

If the ramp bridge is framed directly into the primary members of the mainline bridge, the components supporting the beginning of the ramp bridge are inspected as primary members for the ramp bridge.

When inspecting a pier on the mainline structure of a bridge that also supports a ramp structure, inspection should include the part supporting both the mainline and ramp structures.

All elements supporting the mainline structure should be included in the assessment for the pier of the mainline structure. The pedestals, cap beam, columns, footings, and piles supporting both the main bridge and the ramp bridge should be inspected with the main bridge. If mainline pier deficiencies adversely affect the ramp bridge, cross-referenced remarks on the mainline and ramp inspection reports are necessary.

If a deck joint exists, the joint between the ramp and mainline should be assessed with the ramp’s beginning substructure.

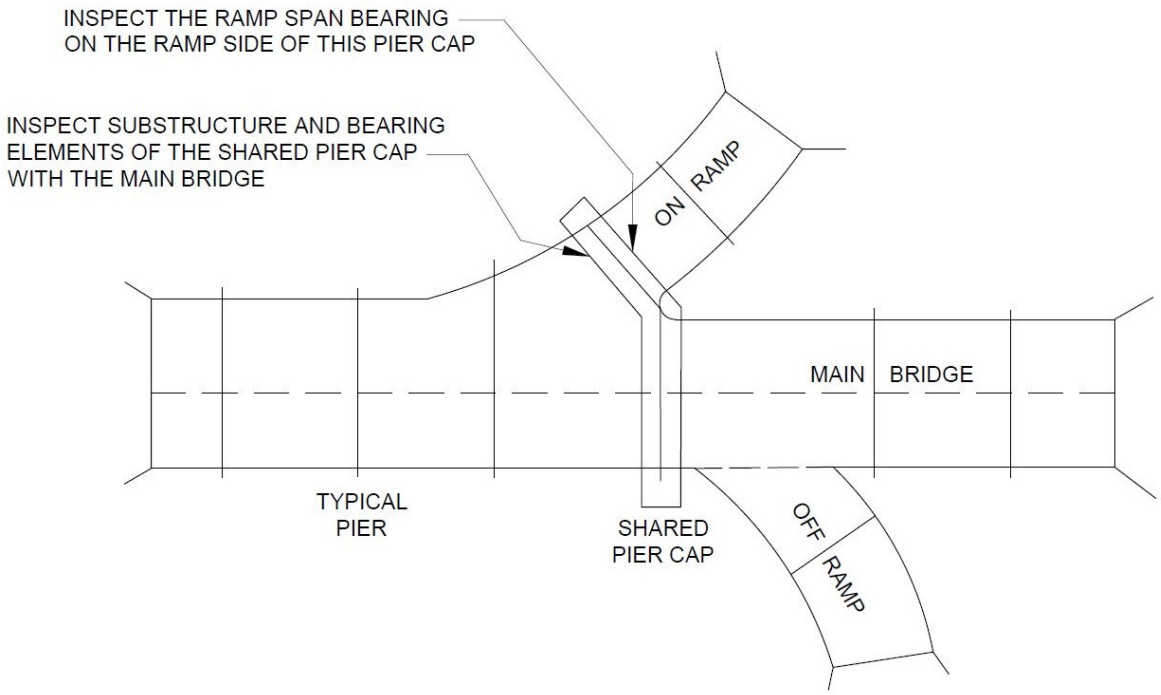


Figure 6-1: Ramp Bridges

6.4. Border Bridges

The FHWA recognizes the problem of incorrectly coding data items for border bridges and published a memorandum on Border Bridges in the NBI on February 9, 2018. All border bridges must be recorded and submitted in both neighboring states' inventory. States must communicate with neighboring states to ensure consistent data for both bridge records. An agreement with the neighboring state(s) need to be maintained in the bridge files.

DOTD manages a total of 16 border bridges. Refer to a complete list with hyperlinked recall numbers in the Appendix (A-20).

6.5. Movable Bridges

A movable bridge (bascule, vertical lift, swing, pontoon) is defined as a bridge where a span can be moved by in-place mechanical or other means to allow for the passage of navigational traffic (boats or barges) per the proceedings of the American Society of Civil Engineers (ASCE), Volume 33, Part 1, Page 154. Louisiana has four types of movable bridges in service across the state: bascule, vertical lift (table), swing, and pontoon. A bridge with a removable span that can be removed to allow access or passage and can be reset is not considered a movable bridge.

Inspections of movable structures may involve both an electrical and a mechanical inspector or technical assistance. Generally, the inspection of mechanical and electrical components of movable bridges is beyond the scope of general bridge inspections, but structural components of movable spans must be

inspected with the same intensity and frequency required for conventional bridges. Movable bridges are considered complex bridges. The interaction between the movable bridge and the machinery will also need to be addressed because the mechanical/structural interaction is important for adequate inspection and maintenance of the machinery. Therefore, inspectors will identify the following within the structure notes of each of these complex bridge inspection reports: special conditions, any specialized inspection procedures, any additional inspector experience and training needed, or any specialized technical assistant, such as electrical or mechanical, that might be required (refer to Section 5.3 Complex Bridges).

A movable bridge should have its own Operation and Maintenance Manual. If available, the inspection team should review the manual to determine any special conditions. If not available, judgment should be used where specific conditions not covered by the manual are encountered.

Additional information regarding movable bridges can be found in the AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual* and the FHWA *Bridge Inspector's Reference Manual*. Consultant led In-Depth Bridge Inspections must use the AASHTO *Movable Bridge Inspection Manual*. Refer to Section 9 for hyperlinks to these manuals. In the 2020 inventory, Louisiana has 139 movable bridges (bascule, vertical lift, swing, pontoon) in service across the state. A list of On-System and Off-System movable bridges can be found in Section 10 (see Appendix A-19). Figure 6-2 shows the number of On-System movable bridges in the state by District.

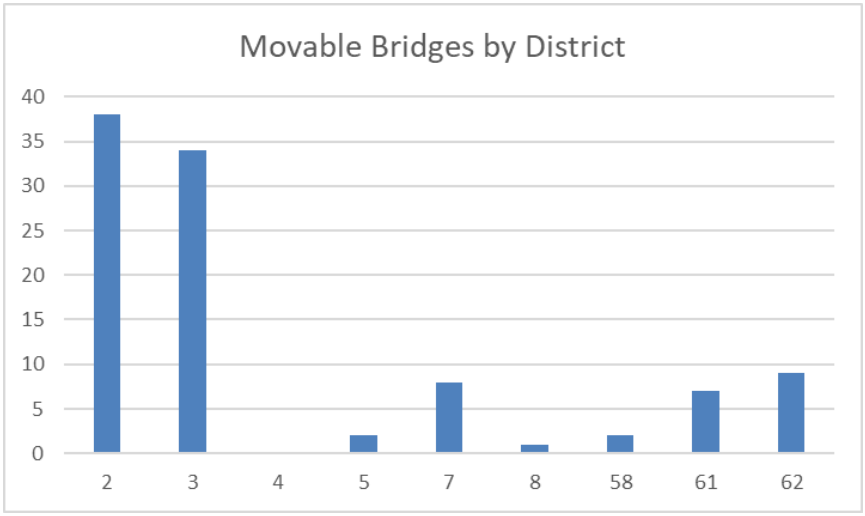


Figure 6-2: Movable Bridges Statewide

Pontoon Bridges

A pontoon bridge in Louisiana is constructed primarily of a steel floating pontoon (barge). Pontoons are large watertight chambers that can be continuous or separate. A confined space entry permit may be needed to access the interior section of a pontoon.

Common deficiencies include the following:

- Corrosion of anchor cables
- Fatigue cracking

- Overloads
- Collision damage
- Water infiltration

Measure and record the depth of water found in each cell. Note the condition of the pumping system and follow up with maintenance personnel with any problems. Examine the pivot arm collection, cable ends, and anchor cable saddle for frayed and broken strands. Note if a cathodic protection system exists.

Figure 6-3: Pontoon Bridge

Steel High Truss Swing Span

Figure 6-4: Steel High Truss Swing Span. Source: Moffatt & Nichol, LADOTD

Steel Low Truss Swing Span

Figure 6-5: Steel Low Truss Swing Span

Steel Plate Girder Swing Span

Figure 6-6: Steel Plate Girder Swing Span

Steel I-Beam Swing Span

Figure 6-7: Steel I-Beam Swing Span

Steel Truss Bascule Span

Figure 6-8: Steel Truss Bascule Span

Steel Plate Girder Bascule Span

Figure 6-9: Steel Plate Girder Bascule Span. Source: Moffatt & Nichol, LADOTD

Steel Tower Vertical Lift Span

Figure 6-10: Steel Tower Vertical Lift Span. Source: Moffatt & Nichol, LADOTD

Concrete Tower Vertical Lift Span

Figure 6-11: Steel Tower Vertical Lift Span. Source: Moffatt & Nichol, LADOTD

6.6. Cable-Supported Bridges

There are two cable-stayed bridges in Louisiana, the John James Audubon Bridge and Luling Hale Boggs Memorial Bridge. These cable-supported bridges require special inspection procedures and should be routinely revised in accordance with recent inspection operations.

Cable-stayed bridges are sensitive to dynamic forces due to their flexibility and high stress levels in main load-carrying members. Dampening systems are used in the cables and should be inspected for deterioration and adequacy. Local and global vibrations of the cables induced by wind or other means should be observed and documented.

Vibration can cause the following problems:

- Open cable wires allowing entry of corrosive chemicals
- Accelerated corrosion
- Fretting

- Cracks in coating and cement grout
- Possibly accelerated fatigue
- Anchor cover cracks

Causes of vibrations include the following:

- Rain/wind induced
- Sympathetic with other bridge elements
- Inclined cable galloping
- Vortex excitation with a single cable or a group of cables

6.7. Post-Tensioned Tendon Elements

In post-tensioned members, transfer of tendon tensile stress is accomplished by mechanical end anchorages and locking devices. Field applications are rare, steel, stainless steel, and carbon fiber reinforced polymer rods or strands are becoming the material of choice. Precast concrete slab units may be post-tensioned together with tie rods having a tensile capacity of 145 ksi grouted at the shear keys with the purpose of enabling the slab units to act monolithically. Cracked grout or rust staining may indicate a failure of the post-tensioning rod or loss of monolithic action.

Verify the condition of the lateral post-tensioned grout pockets and visible ends of the rods.

6.8. Material Testing

Laboratory or construction related material tests are stored by project number in the files at the Materials and Testing Lab in the Content Manager. Construction records have been stored in Site Manager and the Materials Lab is migrating to Site Manager-Materials for future projects. Refer to Section 5.4 for more information regarding nondestructive testing.

6.9. Access and Technology

The size and configuration of a bridge can present difficulties when accessing each component to perform a complete inspection. In such cases, Inspectors should record appropriate access guidance within the inspection comments. These notes may include special procedures, personnel coordination, safety concerns, and optimum periods of the year to inspect the bridge. In many cases, qualified consultants will be contracted to perform inspections with access challenges.

All field personnel must be physically capable of performing tasks associated with their positions. All field personnel must be properly trained and able to work at heights, on ladders, and on aerial lifts. Should inspectors be exposed to a fall hazard, all personnel will be certified in fall protection according to the DOTD Loss Prevention Safety Manual. Should work at height, in confined spaces, or under adverse weather be required, a Job Safety Analysis (JSA) will be prepared and approved by the Loss Prevention section.

All underwater bridge inspections are contracted out to consultants who are ADCI-certified commercial divers. Consultants should prepare JSAs and operate under OSHA standards for all activities. Divers must be capable of working within tolerable limits of underwater hazards.

Culverts that are long, submerged, or present unusual problems in obtaining barrel measurements may need to be evaluated in different ways. Factors to be considered include safety, cost of special access, depth of fill, age and condition of the culvert, soil pH, and hydraulics. Culverts can be considered confined spaces if over 100 ft long with limited ventilation, several bends or intersecting laterals large enough for occupancy. Refer to Section 4.7 for Confined Space Protocol. Refer to Section 5.4 for further inspection protocol of culverts. DOTD will be looking at applicable technology to aid in the inspection of partially or fully submerged culverts.

Drones

Unmanned aerial systems (UAS), commonly referred to as drones, provide an excellent access option in certain situations and they have scalable technology which is currently being tested across the nation. Drone use on a bridge inspection must be approved by the DOTD Headquarters Bridge Inspection Office or the District Bridge Engineer.

All aircraft must be certified and registered by the FAA for commercial use. The drone pilot must maintain line of sight with the aircraft. Drones cannot be operated within 5 miles of an airport without prior authorization. Exemptions from standard rules can take several months to receive FAA approval.

DOTD is currently testing drone capabilities on selected bridge sites to identify the advantages and disadvantages as they relate to bridge inspection. The overall value of using drones is different at each bridge site and is generally determined by the structural configuration, type of inspection, traffic flow priorities, safety considerations, environmental conditions, structural capacity, and cost comparisons of alternative methods.

Rope Access

Rope access is an acceptable means to access elements on a bridge, particularly for fracture critical and in-depth inspection types that require a “hands on” inspection. Bridge inspectors must have specialized training prior to utilizing rope access techniques on bridge inspection. The Society of Professional Rope Access Technicians (SPRAT) has developed standards that will be observed during operations.

Advantages of using rope access techniques include:

- Safe mobility of the inspector for best positioning at any location on a bridge,
- No (or minimal) impact on the traveling public,
- Alternative to using under bridge inspection vehicles for bridges with weight limit restrictions.

Figure 6-12: Bridge Inspection with Rope Access. Source: Engineering Operations, CDOT

Underwater Acoustic Imaging

Louisiana ranks 4th in the country for combined surface area of their bridges. Most of Louisiana's bridges are over large waterways, several with high flow velocities, over 50 ft deep, zero visibility and significant timber debris buildup. The environmental conditions in Louisiana present a need to utilize sonar technology, in conjunction with trained commercial divers, to completely and accurately assess submerged substructures during an NBIS underwater bridge inspection. High-resolution underwater acoustic imaging (UAI) has proven to be a viable method to augment these underwater inspections with commercial divers. Proper experience and training is necessary for accurate data collection. Graphical outputs require interpretation by experienced bridge inspectors. UAI services will be contracted to consultants through the Headquarters Bridge Inspection Office on an as-needed basis with FHWA approval.

UAI technology should be considered when overcoming the following conditions:

- Extreme depths
- Significant flow velocities
- Limited visibility

- Potential debris buildup
- High volumes of vessel traffic
- Scour, undermining, and other channel stability concerns
- To verify as-built drawings, monitoring construction activities or documenting post-construction repairs
- Expedited damage assessments such as vessel impacts or flood events
- Security threat assessments

Limitations of UAI technology should also be considered:

- The size range of detectable deficiencies can be limited by the technology and/or the methodology.
- When attempting to detect the depth of a void or depth of undermining it is often difficult or inaccurate.
- Operator proficiency and experience are vital to the interpretation of data and overall quality of the work.
- Observation of deficiencies will be limited to a Level I inspection only.
- Soil compensation data and penetration depths around the foundation will be missing without divers.
- Refilled scour holes cannot be detected with sonar technology. Geophysical sub-bottom profiles will be needed to determine variations in channel bed densities.

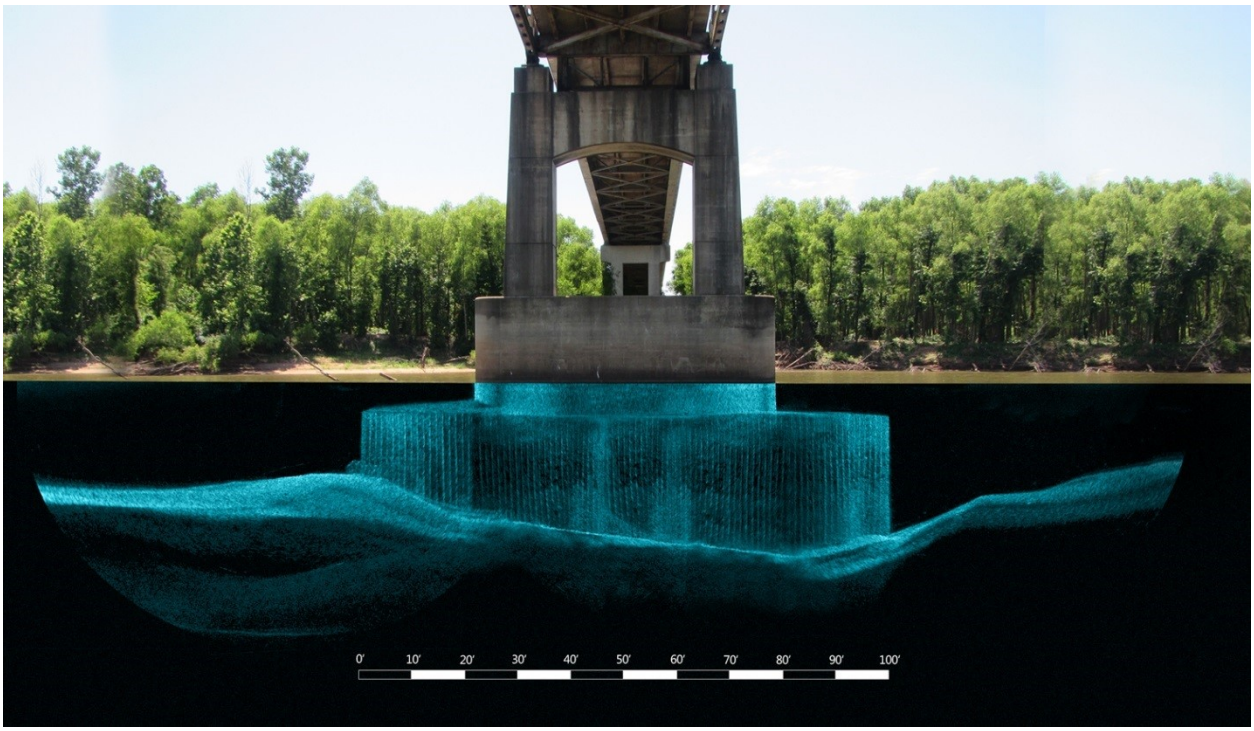


Figure 6-13: Underwater Acoustic Imaging. Source: Moffatt & Nichol, LADOTD

CHAPTER 7:
REPORTING PROCEDURES

CHAPTER 7. REPORTING PROCEDURES

A uniform bridge inspection program is essential to protecting the traveling public and investment in bridge structures. DOTD is responsible for collecting, reviewing, and submitting all bridge inventory data to the FHWA annually in accordance with the NBIS. Each bridge file will contain comprehensive reports and SI&A records but may also include attachments.

The bridge inspection report may include the following:

- Table of contents
- Location map
- Bridge description and history
- Executive summary
- Inspection procedures
- Inspection results
- Photographs
- Drawings and sketches
- Load rating summary
- Recommendations
- SI&A sheet
- Appendices
  - Underwater inspection report
  - Scour analysis
  - Load capacity analysis
  - Material testing results
  - Plans
  - Previous field notes or miscellaneous inspection notes

DOTD is currently using the AssetWise database to collect and manage bridge records. Local Bridge Owners and Consultants can formally request access to their respective bridge data via AssetWise through the Headquarters Bridge Inspection Office. There will be some confidential, privileged, and non-discoverable information aspects regarding the information that will have to be agreed.

7.1. AASHTO ELEMENTS

Element-level inspection quantities will be measured and tabulated with each regularly scheduled inspection. National Bridge Elements (NBEs) will be coded in accordance with the AASHTO *Manual for Bridge Element Inspection*.

Bridge Management Element (BME) data is not submitted to the FHWA but is collected to facilitate bridge preservation assessments and performance measurements. The BMEs can affect the NBE ratings. The NBEs must have consistency in the condition state language, but the BMEs may deviate from the condition state language found in the AASHTO Manual for Bridge Element Inspection, as long as the four condition states still represent good, fair, poor, and severe conditions. Refer to Appendix A-7 for a matrix of NBE element numbers.

7.2. SI&A AND NON-SI&A CODING GUIDANCE

The Headquarters Bridge Inspection Office will review and approve changes to SI&A data.

Scheduling inspection dates in AssetWise is a critical task. This field should be fully understood and carefully populated. Please contact the Headquarters Bridge Inspection Office for clarity on scheduling matters.

Item 90 *Inspection Date* is the routine inspection date which is updated when an inspection is performed.

Item 91 *Routine Inspection Frequency* is the number of months between designated inspections of the structure. It should be noted that bridges will also require special non-scheduled inspections after unusual physical traumas such as floods, earthquakes, fires, or collisions; precaution should be taken with the designated inspection frequency when attempting to maintain the structure in its inspection cycle.

Item 92 (A, B and C) *Critical Feature Inspection* are critical features that need special inspections or special emphasis during inspections and the designated inspection interval in months. Maximum inspection frequencies are below:

- Item 92A Fracture Critical Details = 24 months
- Item 92B Underwater Inspection = 60 months
- Item 92C Other Special Inspections = 12 months

Good notation records should be kept in the inspection notes to identify the type of inspection being performed.

Refer to Section 5.4 regarding factors that will increase the inspection frequency. Refer to the DOTD *2017 Recording and Coding Guide*.

7.3. ASSETWISE OVERVIEW

The previous bridge record storage system, STRM (Structure Inventory Database) is no longer active and is currently used only as a reference for bridge recall numbers. The hard-copy bridge folder file is no longer active as all files have been transferred to the network bridge folders or Content Manager. AssetWise (previously referred to as InspecTech) is now the bridge record storage along with Content Manager bridge files.

AssetWise is an industry-based inspection management software that is utilized by DOTD to log, track, and manage inspection of bridge assets. AssetWise training can be provided by the HQ Bridge Inspection Office upon request.

Refer to the DOTD *2017 Recording and Coding Guide* for further guidance.

7.4. Critical Finding Follow-Up

All bridge inspection critical findings will be documented in accordance with the procedures below. Status will be monitored closely by the ADA of Operations or the District Bridge Engineer until resolved with periodic updates as required.

23 CFR 650.309 requires that critical findings be documented in accordance with any follow-up actions and a process implemented for periodic notifications/updates to FHWA. The Headquarters Bridge Inspection Office will be responsible for preparing an update for submittal to FHWA during the first week of each month.

On-System Documentation of Critical Findings

When an Inspector discovers a critical finding during an inspection or is aware of one through other means, it will be brought to the attention of the District Inspection Supervisor and ADA of Operations or District Bridge Engineer.

The finding will be recorded in a dated inspection report in AssetWise along with necessary photos and sketches. The Inspector will issue a work request through the Agile Assets MMS and record the recommended repairs and work request number in the inspection report.

When work is complete, a new special inspection report will be entered into AssetWise, including the completed and signed work request form. If repairs are made promptly enough (less than seven days), the finding, work request number, and notation with photos/sketches of repairs may be included in the original inspection report. Condition ratings, appraisal ratings, access equipment and manpower must be reported after repairs are made.

If a structural repair is needed and cannot be made within 90 days of the work request approval in AssetWise, a load rating must be requested within 7 days following the 90-day repair window.

Off-System Documentation of Critical Findings

When an Inspector discovers a critical finding during an inspection or is aware of one through other means, it will be brought to the attention of the District Inspection Supervisor and ADA of Operations or District Bridge Engineer.

The finding will be recorded in a dated inspection report in AssetWise along with necessary photos and sketches. The Owner must be properly notified of the deficiency.

When work is complete and the Owner has submitted the engineer's updated inspection report performed under a qualified TL oversight and load rating to re-open the bridge, a new routine inspection report will be entered in to AssetWise documenting completion of the work and attaching the Owner's completed and signed inspection form and load rating.

Reporting to FHWA

It is the responsibility of the Headquarters Bridge Inspection Office (HQ) to prepare a monthly summary report of all recently determined structures meeting the critical findings definition (refer to Section 5.17). HQ will also update any existing structure status already on the critical finding list that is being monitored or awaiting action to be performed. HQ will rely on the District ADA of Operations and District Bridge Engineer to provide the recommended action and its status/update. Reported items consist of:

- Recall No.
- NBI Structure No.
- Condition ratings for NBI Items 58, 59, 60, or 62
- Date reported
- Brief finding explanation
- Recommended action
- Date action completed, if accomplished

The critical findings report with new and/or updated status will be formally submitted to FHWA during the first week of each month via email.

7.5. Work Requests

The Bridge Maintenance Work Request is an interim process to be used for notating, completing, and tracking maintenance required on all state-owned bridges in Louisiana via the Agile Assets Maintenance Management System (MMS). It is a requirement of the National Bridge Inspection Standards (NBIS) that **all** bridge inspection findings and documentation of any corrective actions taken be kept as part of the bridge file. It has been further required by the FHWA Division office that a formal process be set in place to track such findings and corrective action. Therefore, this work request process is to be used by all Districts and the requests will generally be issued by bridge inspectors.

The “Priority” drop-down selection type field must be filled in for every work request.

The selections are Emergency, High, Medium, and Low, and are distinguished as follows:

i. *Emergency* – The bridge is assumed to be in imminent failure and work must begin within 7 calendar days and/or the structure may need to be physically closed until repairs can be made.

ii. *High* – A primary structural support member is found to be in a serious condition and work must begin within 30 calendar days or the structure may require temporary restrictions to loads, lanes, etc.

iii. *Medium* – A secondary support member is found to be in a serious condition and work must begin within 3 months or the structure may require more frequent monitoring and/or temporary restrictions to loads, lanes, etc.

iv. *Low* – This level is generally for bridge preservation measures and work must begin within 12 months.

7.6. Delay Documentation

Should an inspection need to be delayed due to unusual circumstances, and provided the request is made before the inspection is determined to be late (i.e. the inspection month is not exceeded), FHWA **may**—after a review of specific requests—issue a waiver for up to a 30-day grace period. FHWA defines unusual circumstances as "…severe weather, concern for bridge inspector safety, concern for inspection quality, the need to optimize scheduling with other bridges, or other unique situations…." Every effort should be expended to avoid a delay in the scheduled inspection. Should this occur, the following steps must be taken for proper documentation:

1. As soon as practical, and preferably prior to the inspection(s) becoming delinquent (i.e. inspection month exceeded), email the Headquarters Bridge Inspection Office with the following details:
    - Which bridges will be delayed
    - The specific "unusual circumstance" causing the delay
    - The expected date of the actual inspection
2. The Headquarters Bridge Inspection Office will make a formal request to FHWA for approval of any inspections delayed past the 24th month and will forward the approval(s) back to the Districts.

    Upon completion of the inspection, the inspector will document the specific cause for every inspection that is delayed past the 24th month in the inspection notes (i.e. "bridge site was in a hurricane damaged area that was inaccessible for three weeks" — not just "severe weather" or "Hurricane Isaac"). Where FHWA has approved the delay of inspection into the 25th month, the letter of approval will be attached to the inspection report media content and notated within the report's inspection notes.

Any inspection performed past the 24th month will be counted against the Department's compliance with FHWA Metrics 6 & 7. Delayed inspections that received a concurrence from FHWA for an unusual circumstance and were inspected no later than the 25th month will be exonerated from the tally during the compliance review.

Underwater inspections that are delayed will be documented in the inspection notes and the Headquarters Bridge Inspection Office will be notified via email.

7.7. Fracture Critical Documentation

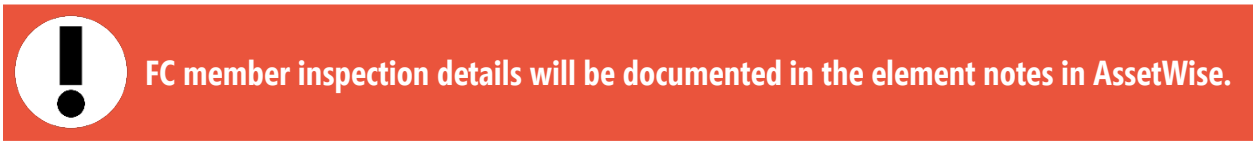
A fracture critical member (FCM) is defined as a steel member in tension, or with a tension element, whose failure would probably cause a portion of or the entire bridge to collapse. A FCM might sometimes be reference as a nonredundant steel tension member (NSTM). All bridges that have fracture critical members will have a hands-on inspection and be inspected in accordance with 23 CFR 650.311 (c) and all inspection details should be properly noted.

Identifying Fracture Critical Members

Inspections begin with advanced planning based on an office review of structural plans. Aspects that should be obtained from this review and noted in the inspection report (inspection notes) are as follows:

- Identify FC members
- Note any members that may require special field attention, such as built-up tension members
- Note means of necessary access to the members
- Note availability of special tools and equipment used to perform the inspection

Documenting the Inspection of Fracture Critical Members



Required minimum documentation is as follows:

- Note that a “hands-on inspection” was performed
- In the element notes for an FC member, state that the member is FC or contains FC details
- Location of FC member on the bridge and method of access to the member
- Method of FC member inspection such as visual and/or nondestructive testing (if NDT, state type)
- Date of inspection and inspector’s full name
- Findings
  - If no cracks/defects are found, explicitly state “no defects found” in the element notes
  - If cracks/defects are found, record the following details:
    - General location of crack with respect to entire bridge and exact location on the member.
    - Original dimensions and details of the member containing the crack/defect along with dimensions and details of modifications to the member.
    - Date, temperature and weather condition when the crack/defect was first detected, confirmed by NDT, and reexamined on subsequent inspections.
    - Label the member with the date of inspection and initials of a certified inspector using permanent marker or paint pen [be sensitive to aesthetics at prominent areas and on historic structures].
    - Provide detailed sketches of crack that show length, width, depth, and photographs of crack.
    - Noticeable conditions of the crack when exposed to live load such as lengthening, opening and closing, distortions.
    - General condition at the location of the crack such as corrosion, dirt, debris, traffic impact, steel type (if available).
    - Risk factors.

Possible risk factors that could contribute to a heightened concern for the performance of the FCM should be included in the report, such as fatigue-prone details, potential out-of-plane distortion details,

superstructure condition rating of 4 or less, load posting of the bridge, subject to overloads or impact damage, high ADT, older service life, problematic materials, poor welding techniques, previous cracking or repairs, source of previous cracking, and removal of debris.

7.8. Bridge Rehab Documentation

Following a bridge rehabilitation project, as-built plans will be added to the bridge file.

Dimensions and quantities will be determined from the rehabilitation project plans and used for revisions to the element-level quantities and SI&A items documentation.

A special inspection will be performed to include:

- Bridge elements that have been rehabilitated
- Revised notes on the rehabilitated structure
- Updates to the condition ratings of the rehabilitated structural elements
- Revisions to the element-level inspection quantities for the rehabilitated elements
- SI&A Items will be verified or changed based on the rehabilitated structure

A revised load rating should be completed for the as-built rehabilitated structure using the as-built plans and the reported inspection findings.

Refer to Section 6.1 for inspections coinciding with rehabilitation projects.

7.9. Scour Evaluation

Scour is the removal of material from the streambed or embankment as a result of the erosive action of streamflow. Scour can occur locally at a substructure unit and globally across the waterway. The depth of scour will vary for different streambed materials and streamflow rates.

There are three manuals issued by FHWA to provide specific guidance for evaluating bridge scour and stream stability:

1. HEC-18 *Evaluating Scour at Bridges*
2. HEC-20 *Stream Stability at Highway Structures*
3. HEC-23 *Bridge Scour and Stream Instability Countermeasures*

In many cases, knowledge of the foundation type and an HEC-20 evaluation will be enough to determine the low risk of stream instability or scour problems.

When an actual or potential scour problem is identified by a Bridge Inspector, further evaluation of the bridge is needed by an interdisciplinary team of structural, geotechnical, and hydraulic engineers.

Depending on the level of analysis, additional bridge geometry or waterway characteristics may be required. Current waterway inspection data should be compared to previous inspection data to identify channel changes.

Soundings will be performed at all routine and underwater inspections to track changes in the channel between inspection cycles.

This "tracking" of channel change over time is an important step in ensuring the safety of the bridge. Over time, vertical changes due to degradation or aggradation processes, or horizontal alignment changes due to lateral migration of the channel, could result in foundation undermining, bridge overtopping, or even collapse. If major changes are found, a formal scour analysis of the site will be needed to estimate floodwater elevations, velocities, angle of attack, and potential scour depths. Potential threats to bridge members caused by channel changes can be resolved before damage occurs.

In assessing the adequacy of the bridge to resist scour, the inspector and engineer need to understand and recognize the interrelationships between several items. The inspector can expedite the engineer's evaluation by considering the following:

- Substructure condition rating (Item 60)
- Channel and channel protection condition rating (Item 61)
- Waterway adequacy appraisal rating (Item 71)
- Scour critical bridges (Item 113)

Refer to Section 5.13 (Streambed Documentation) and Section 5.14 (Monitoring Scour POAs) for related information.

7.10. Load Rating

A load rating is defined in the NBIS as "the determination of the live load-carrying capacity of a bridge using bridge plans and supplemented by information gathered from a field inspection." To maintain the accuracy and consistency of inspections and load ratings, bridges being investigated for load capacity must be inspected for condition as per the latest edition of *AASHTO Manual for Bridge Evaluation (MBE)*, which is specified in Part II Volume 5 – Bridge Evaluation/Rating of the *DOTD Bridge Design and Evaluation Manual (BDEM).* In many circumstances, the most recent inspection report is the load rater's only source for the condition and extent of deterioration of bridge structural components. As such, the quality of a bridge inspection and bridge inspection report directly impacts the accuracy and reliability of a load rating.

Each local bridge owner is responsible for determining the load-carrying capacity of bridges under its jurisdiction in accordance with the AASHTO Manual for Bridge Evaluation, Chapter 6 – Load Rating, 23 CFR 650.313 (c) and the DOTD EDSM I.1.1.8. DOTD provides assistance to the local bridge owner by load rating timber structures with timber super structure and timber substructure elements.

If a subsequent routine or interim inspection shows that the bridge condition has changed and invalidates the original load rating, the Bridge Owner is responsible for load rating the bridge to reflect the current condition. DOTD bridge inspectors must ensure that load ratings and load postings in the bridge inventory data for each off-system bridge agree with the observed/reported condition of the bridge.

Repairs may require a re-rating of the bridge. If performing in-kind or better repairs on non-timber bridges, the DOTD DBE or the local bridge owner (professional engineer) may apply a previous rating on file for the bridge in certain situations. Details of the repairs and a letter stating that the prior rating is now applicable must be submitted to the District Bridge Inspection Office and the Load Rating Engineer.

FHWA Load Rating Metric

FHWA Metric #13 "Inspection Procedures – Load Rating" is used to evaluate compliance with the 23 CFR 650.313(c) requirements to rate each bridge for safe load-carrying capacity in accordance with the *AASHTO Manual for Bridge Evaluation (MBE)*. The population for the metric is all bridges in the state open to traffic, including bridge-length culverts. Compliance with this metric is met if the FHWA review finds all bridges to have an NBI load rating determination and documentation in accordance with AASHTO MBE that supports the load rating determinations. The bridge load rating analysis must be consistent with actual field conditions, as documented by the most recent inspection report. Compliance deficiencies found under Metric #12 "Inspection Procedures – Quality Inspections" could trigger an additional FHWA review of Metric #13 or be applied to the compliance determination by FWHA for Metric #13.

Role and Responsibility

DOTD EDSM No. IV.4.1.2 establishes that the load rating function of the DOTD Bridge Inspection Program will be managed by the Load Rating Engineer. In support of the bridge load rating, the bridge inspector documents the present condition of the bridge in the report. The Load Rating Engineer, or a qualified delegated individual, compares the bridge's present condition to the condition of the bridge used for the existing bridge rating analysis. A re-rating will be performed as specified by EDSM No. I.1.1.15.

Bridge Re-Rating Policy

The DOTD bridge re-rating policy is provided in EDSM No. I.1.1.15, which includes the required frequency of re-rating or review by an engineer as a result of the lowest structural condition rating assigned by the bridge inspector.

7.11. Timber Bridge Rating

When a bridge containing timber spans is inspected by DOTD District Bridge Inspectors, each timber span will be evaluated to determine:

- The consistency of the calculated ratings (inventory, operating, and posting vehicle) with the currently observed condition of the structure,
- The presence of a current (not more than four years old) Timber Rating Form on file for that structure.

All timber ratings for On-System and Off-System bridges are performed by the DOTD Headquarters Bridge Inspection Office Office.

The Timber Rating Form is completed by DOTD Inspectors during 48-month routine inspections. DOTD and local bridge owners are responsible for reviewing these ratings and ensuring that the bridges are properly weight restricted, if necessary (refer to EDSM I.1.1.8). DOTD or local bridge owners are responsible for installing required weight limit signs by the minimum timeframe (refer to Section 5.15).

In critical situations, the Timber Rating Form and the inspection report can be emailed to the Headquarters Bridge Inspection Office for further evaluation and processing. Upon completion of the evaluation by the Headquarters Bridge Inspection Office , the results of the Timber Rating will be emailed to the District Bridge Engineer and uploaded to AssetWise.

All Timber Ratings must be reviewed, stamped, and signed by a licensed Professional Engineer.

7.12. POSTING

If a bridge is not capable of carrying statutory loads as a result of the load rating, the bridge is to be posted for a lesser load limit. Regulatory signing for the bridge load restriction will conform to the EDSM No. I.1.1.8, *Manual on Uniform Traffic Control Devices (MUTCD)* or other governing regulations.

If load posting/restriction is required, it needs to be carried out in accordance with the FHWA Memo *Timeframe for Installing Load Posting Signs at Bridges*, dated April 17, 2019, and DOTD's posting policy: "bridge load postings are to be made as soon as possible but no later than 30 days after a load rating determines a need for such posting."

FHWA Posting Metric

FHWA Metric #14 "Inspection Procedures – Post or Restrict" is used to evaluate compliance with the 23 CFR 650.313(c) requirement to post or restrict a bridge in accordance with AASHTO MBE or state law. Compliance with this metric is met if a FHWA review finds that all bridges are properly posted or restricted, and all identified posting/closing compliance deficiencies have been resolved. The bridge inspection is one mechanism to periodically document compliance or identify potential non-compliance issues.

Role and Responsibility

The placement of regulatory truck weight limits on all bridges not adequate to carry the maximum legal truck weights allowed is required by Louisiana law. The State Bridge Load Rating Engineer is responsible for initiating and determining weight limits for on and Off-System bridges in Louisiana (refer to EDSM No. I.1.1.8).

In support of bridge posting, the bridge inspector documents the bridge condition. This may prompt a re-rating, resulting in a revision to the posting load based on modifications/additions or a structural condition change. Additionally, the bridge inspector will document the condition of the bridge weight limit signs with photographs, to include the severe deficiency that may affect the weight limit on the signs at a bridge.

7.13. Signing and Sealing

According to La. R.S. 37:682(12)(a,b), 37:682(14) and 37:682(15), the application of professional judgment and one who provides responsible professional services is performing work as a "practice of engineering", and the completed work will be signed and sealed.

All load rating calculations and all scour analysis will be stamped, signed, and dated by a registered professional engineer. Stamped load rating summary sheets showing the controlling rating will be loaded into AssetWise.

In-depth movable bridge inspection reports will be signed and sealed by a single registered professional engineer who served as the Team Leader.

CHAPTER 8:
QUALITY CONTROL / QUALITY ASSURANCE

CHAPTER 8. QUALITY CONTROL / QUALITY ASSURANCE

Programming/prioritization, funding appropriation, and public safety for the structures are determined by interpretation of NBIS inspection reports. In order for DOTD to benefit, a high degree of accuracy and consistency is needed. For this reason, strong QC/QA measures are needed to make sure that the right individuals are in the field completing the inspections, and that correct information is received by the individuals responsible for the structures. The essentials of a QC/QA program will comprise:

- Office reviews of every report by technical experts via quality control.
- Field reviews of select bridges by technical experts via quality control
- Independent office and field reviews of the quality control plan via the quality assurance plan.
- Action plan, if discrepancies are identified in the review process.

Figure 8-1: "Field" Review of Bridge Inspection

8.1. PROGRAM OVERVIEW

This chapter establishes policies on how the DOTD and local agencies conduct QC/QA procedures on the Bridge Inspection Program to comply with FHWA requirements within 23 CFR 650.307(c), 650.313(g). According to the NBIS in Title 23 (Highways) of the Code of Federal Regulations Part 650.313(g), the state of Louisiana is required to "assure systematic quality control and quality assurance procedures are used to maintain a high degree of accuracy and consistency in the inspection program. Include periodic field review of inspection teams, periodic bridge inspection refresher training for Program Managers and Team Leaders, and independent review of inspection reports and computations." The policies documented herein have been approved for use by the FHWA. Local agencies can adopt their own QC/QA policies and procedures but require similar documentation and must obtain the approvals of the Headquarters Bridge Inspection Office and the FHWA Division Bridge Engineer for Louisiana.

Five major topics frame the accuracy and consistency of the Bridge Inspection Program according to the NBIS 23 CFR 650:

- Bridge Inspection Organization (650.307); Section 2
- Inspection Staff Qualifications and Re-certification (650.309); Section 5.1
- Inspection Frequency (650.311); Section 5.3
- Inspection Procedures (650.313); Section 5
- Inventory (650.615); Section 5

The FHWA performs annual reviews of the bridge inspection program based on the requirements set out in the *Metrics for the Oversight of the National Bridge Inspection Program* (23 Metrics). Metric #20 is a review of QC/QA procedures. The review process incorporates measures of those metrics, which aid in forecasting compliance levels.

In addition to adhering to the FHWA 23 Metrics, maintaining accuracy, thoroughness, and completeness of bridge safety inspections is essential for evaluating a structure's safety and for decisions associated with planning, budgeting, bridge preservation, and future replacement requirements.

8.2. Definitions

Quality Control (QC) is defined as procedures intended to maintain the quality of a bridge inspection and load rating at or above a specified level, per 23 CFR 650.305. QC is performed within a work group.

Quality Assurance (QA) is defined as the use of sampling and other measures to ensure the adequacy of QC procedures in order to verify or measure the quality level of the entire bridge inspection program. QA is performed outside of a work group.

Figure 8-2 shows how QC and QA are related and how they fit into the hierarchy of a quality program.

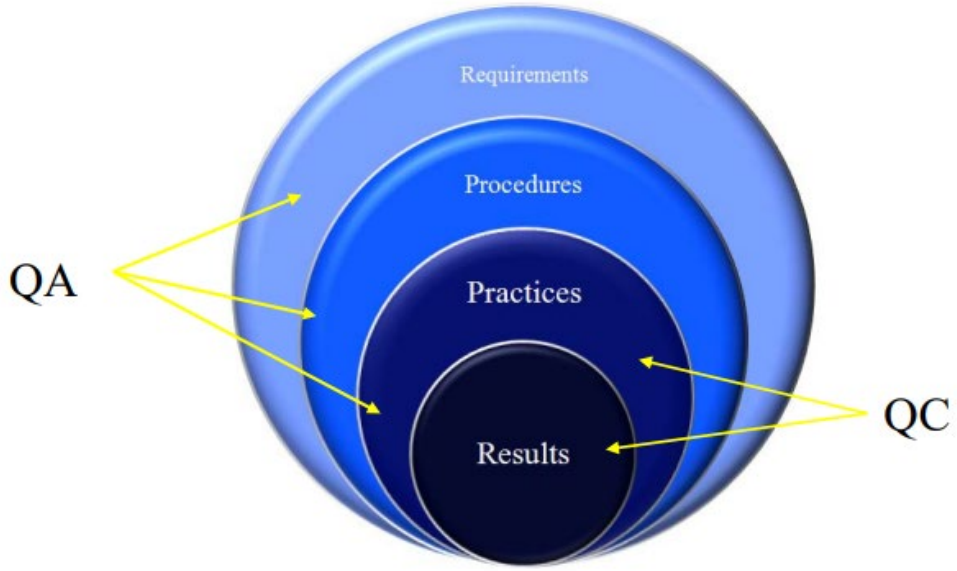


Figure 8-2: QC vs. QA Venn Diagram

The following section outlines the minimum acceptable standards for QC/QA for the DOTD Bridge Inspection Program.

8.3. Quality Program

It is the responsibility of LADOTD to maintain an inventory of all bridges, whether they perform the inspections or not. There are seven major topics to address in an effective QC/QA program:

1. Independent reviews
2. Objective and quantitative measures of quality
3. Quality program documentation

4. Comprehensive coverage of the inspection and load rating program
5. Established procedures for corrective actions
6. Established schedule for evaluations
7. Documented review procedures

Quality Control

The QC program is used to maintain a high degree of accuracy and consistency within the Bridge Inspection Program. It is also used to evaluate and communicate directly with staff about any assessment made of their work. The QC program consists of the following elements:

1. Systematic documentation of inspector qualifications
2. Documented organization of bridge inspection program
3. Required training and retraining programs for inspectors
4. Maintenance of high-quality bridge inspection manual
5. Maintenance of comprehensive bridge files in accordance with the AASHTO Bridge Evaluation Manual and State requirements

The quality control is performed by the District Bridge Engineer and staff in each district. Every bridge inspection report is reviewed for accuracy and compliance in the AssetWise workflow feature. The QC report review is required to:

- Include consistent NBIS ratings
- Be consistent with previous inspection reports
- Contain sufficient documentation and photographs

Bridge File Maintenance

The maintenance of comprehensive bridge files is a QC procedure that helps ensure the quality of the inspection results. The Headquarters Bridge Inspection Office will maintain a current list of the certifications, qualifications, and experience of all active or no longer active bridge inspection personnel in AssetWise to meet the minimum requirements of 23 CFR 650.

Refer to Section 3 for the elements of a bridge file.

Peer Rotation for Quality Control

The rotation of NBIS qualified inspection Team Leaders is a statewide DOTD policy for all On-System and Off-System bridges that are in the National Bridge Inventory. Every routine inspection should have a different Team Leader than the previous inspection.

QC Review Procedures

The purpose of the office review is to ensure that the quality of the process is maintained by confirming that there is a relationship between the field documentation and the ratings in the report. The reviewer

is to ensure completeness and adherence to State and FHWA requirements regarding procedures, guidelines and training.

QC functions for each bridge inspection report are delegated to the Districts or the Consultant who conducted the inspection, and typically include:

- Completeness and accuracy of data captured, and data entered
- Completeness and accuracy of condition (NBI) ratings and element (NBE) ratings
- Adherence of practices to procedures
- Guidelines and training
- Qualifications of personnel

Corrective actions for QC

To maintain the validity and integrity of the bridge inspection report, all changes that occur after the original inspection is complete should be thoroughly documented and the record maintained. All changes should be made by either the Team Leader or by the Quality Control Officer.

Inspector Qualifications

Verifying inspector qualifications is a key element to maintaining compliance with the NBIS. The Headquarters Bridge Inspection Office maintains a list of certifications for all inspection personnel.

Quality Assurance

The QA program is operated from the Headquarters Bridge Inspection Office and is designed to assure the adequacy of QC procedures in order to measure the quality level of the entire bridge inspection program. To maintain the validity and integrity of the bridge inspection report, all changes that occur after the original inspection is complete should be thoroughly documented and the record maintained. All changes should be made by either the Team Leader or by the Quality Control Officer.

The quality assurance program is performed and managed by the Headquarters Bridge Inspection Office. The QA reviews consist of:

- Office review of bridge files
- Verification of current qualifications and training of inspection personnel
- Verification that inspection personnel are operating in the positions they are qualified for
- Check for implementation of correctional measures and follow-up procedures
- Field review of selected bridges

DOTD Headquarters Bridge Inspection Office will provide semiannual reports to the Districts and assigned consultants of upcoming underwater inspections. The *next* UWI will be performed by or before the *previous* UWI month. Scheduling for quality UWI's can sometimes rely heavily on environmental conditions. All underwater bridge inspections may be performed 6 to 12 months

prior to the month of the *next* UWI frequency, as an effort to keep the UWI frequency between 5 and 6 years without becoming delinquent.

Office review of inspection reports

Consultants who perform underwater bridge inspections (for the DOTD or Local Bridge Owners) will be granted Team Leader user access to input inspection data directly in AssetWise. The underwater inspection reports are to be submitted to the DOTD within 30 days of the underwater inspection date for final review and approval within 45 days of the underwater bridge inspection date.

All Fracture Critical inspection reports performed by all Districts in a calendar year will be reviewed by a NBIS qualified Team Leader from Headquarters Bridge Inspection Office.

Additionally, a minimum of 100 routine inspection reports and 50 special inspection reports performed by each District (for a total of 900 routine and 450 special inspection reports) in a calendar year selected at random will be reviewed by a NBIS qualified Team Leader from Headquarters Bridge Inspection Office.

Field review

A minimum of 200 bridge inspection reports are randomly selected from all final report submittals in any given year for re-inspection. These field reviews are used to evaluate the quality and consistency of the data produced from the inspection.

Furthermore, a minimum of 150 bridges are randomly selected each year for a joint inspection with DOTD District teams to evaluate their documentation processes in the field.

Review of bridge files

A centralized reporting system called AssetWise is used to maintain all bridge files and individual records. Inventory and routine error reports are run monthly to flag conflicts in the database. Inspectors' qualifications are verified annually for all bridge inspectors in accordance with NBIS standards.

8.4. Systematic Documentation of On-System Compliance

The 23 NBIP Metrics provide guidance and direction to FHWA Division Bridge Engineers during their annual compliance reviews of the DOTD Bridge Inspection Program on March 15 of every year.

DOTD addresses each metric in the manual at the following locations:

Metric #1: Bridge inspection organization .....Chapter 2
Metric #2: Qualifications of personnel – Program Manager .....Section 5.1
Metric #3: Qualifications of personnel – Team Leader(s) .....Section 5.1
Metric #4: Qualifications of personnel – Load Rating Engineer .....Section 5.1
Metric #5: Qualifications of personnel – UW Bridge Inspection Diver ..... Section 5.1
Metric #6: Inspection frequency – Routine – Lower risk bridges .....Section 5.4
Metric #7: Inspection frequency – Routine – Higher risk bridges .....Section 5.4
Metric #8: Inspection frequency – Underwater – Lower risk bridges .....Section 5.4
Metric #9: Inspection frequency – Underwater – Higher risk bridges .....Section 5.4

Metric #10: Inspection frequency – Fracture Critical Member .....Section 5.4
Metric #11: Inspection frequency – Frequency Criteria .....Section 5.4
Metric #12: Inspection procedures – Quality Inspections .....Chapters 5, 6 and 7
Metric #13: Inspection procedures – Load Rating .....Section 7.10
Metric #14: Inspection procedures – Post or Restrict .....Section 7.12
Metric #15: Inspection procedures – Bridge Files .....Chapter 3
Metric #16: Inspection procedures – Fracture Critical Members.....Sections 5.4 and 7.7
Metric #17: Inspection procedures – Underwater .....Section 5.4
Metric #18: Inspection procedures – Scour .....Sections 5.13, 5.14 and 7.9
Metric #19: Inspection procedures – Complex Bridges .....Section 5.4
Metric #20: Inspection procedures – QC/QA .....Section 8.3
Metric #21: Inspection procedures – Critical Findings .....Sections 5.17 and 7.4
Metric #22: Inventory – Prepare and Maintain .....Section 7.3
Metric #23: Inventory – Timely Updating of Data .....Section 3.3

8.5. Off-System District Compliance

Bridge Inspections

DOTD will perform the 24-month routine inspection on each Off-System bridge in Louisiana. These inspections will be performed by DOTD qualified Team Leader. The inspections must conform to the requirements of the NBIS and the *AASHTO Manual for Bridge Evaluation and Interim Revisions*. Local bridge owners are invited and encouraged to accompany DOTD Bridge Inspectors during these routine inspections.

DOTD Bridge Inspectors will notify local bridge owners 30 days prior to conducting routine inspections in their jurisdictions.

Local bridge owners will be provided with copies of these reports upon completion.

The *AASHTO Manual for Bridge Evaluation* requires interim (reduced interval, typically 6 or 12 months) inspections of bridges with known deficiencies. Local bridge owners are responsible for performing and documenting the findings of these inspections on structures with known deficiencies or structures not capable of carrying the full legal load allowed by Louisiana law. The frequency of interim inspections will be in accordance with Section 5.4.

The interim inspection will include a re-inspection of all components rated 5 or less. Documentation of dates and the findings of interim inspections will be maintained by the Bridge Owner in a file for each bridge under their jurisdiction.

Annual Compliance Review with Off-System Bridge Owners

In September/October each year, DOTD District Bridge Engineers and Bridge Inspectors will visit Off-System Bridge Owners to inspect files. District Bridge Inspection Staff will schedule these visits to determine compliance with interim inspection and load posting requirements. All bridge inspection

reports will be reviewed. In addition, District Bridge Inspection Staff will perform field investigations on bridges that require load posting and closure to determine compliance.

All documents and data corrections related to the annual Off-System review are due to the DOTD Bridge Inspection Engineer by November 15 of each year. Each Local Bridge Owner will submit a certification by the local governing body that they have and will continue to comply with all NBIS/FHWA/DOTD requirements regarding the performance of interim inspections, calculating load-carrying capacity, and load posting/closure of deficient bridges under their jurisdiction. Information collected during the review must be compiled and submitted to FHWA by December 31. The state then receives a final compliance status, and updates to plans of corrective action and improvement are made if necessary.

In addition, the Local Bridge Owner must submit contact information for all individuals or consulting firms that perform inspection and maintenance of their bridges, as well as individuals responsible for maintaining bridge files and the location of bridge files.

Contact information must include name, physical and mailing address, phone number, and email. If the ownership or maintenance responsibility of a bridge changes, District Bridge Inspection Staff should be notified immediately.

Important Off-System Compliance Due Dates

Table 8-1: Off-System Compliance Due Dates

January 31	Bi-annual reports are sent out for corrections
February 1	Deadline to submit plan of corrective action for conditional compliance level
March 1	Submittal of January bi-annual report corrections
July 31	Bi-annual reports are sent out for corrections
September 1	Submittal of July bi-annual report corrections
November 15	Annual resolution
	Contact information for bridge files, inspection, and maintenance
December 31	Final compliance determination and notification to owners

Compliance Levels

There are four levels of compliance assessment:

1) Compliance – All conditions met.
2) Substantial Compliance – Most conditions met. Improvement should be made within the next compliance review year or risk being dropped to conditional compliance.
3) Conditional Compliance – Improvement must be made within the next review year or non-compliance will be enforced. A plan of corrective action must be submitted to address the issues resulting in conditional compliance.

4) Non-Compliance – Critical conditions not addressed or public safety has been impacted by failure to comply. Owner has not improved from conditional compliance from the previous review cycle.

The table below summarizes the compliance conditions and levels. These conditions and levels are subject to change yearly based on federal updates and the statewide compliance assessment. The DOTD Headquarters Bridge Inspection Office can be contacted for assistance with composing plans of corrective action and will review all plans of corrective action. This office is responsible for final determinations of compliance for Local Bridge Owners. Final compliance determination and notification to Local Bridge Owners will be completed by December 31 each year. If required, a plan of corrective action should be submitted by February 1 of the following year.

Table 8-2: Compliance Conditions and Levels

CONDITION	LEVEL
1. Closed Bridges	
All bridges properly closed	Compliance
Any bridge open that should be closed with the owner's jurisdiction	Non-Compliance
2. Posted Bridges	
All bridges requiring posting are properly posted	Compliance
Not all bridges requiring posting are properly posted	Conditional Compliance
3. Interim Inspections	
All inspections performed on time	Compliance
All inspections performed, but only some on time	Substantial Compliance
Inspections not performed	Non-Compliance
4. Load Ratings	
All bridges load rated	Compliance
Plan of corrective action submitted to rate bridges missing ratings	Substantial Compliance
No plan of corrective action submitted for missing ratings	Non-Compliance
5. Bridge Data Corrections	
Corrections performed by deadlines	Compliance
Corrections submitted late	Substantial Compliance
No corrections submitted for one period	Conditional Compliance
No corrections submitted for either period	Non-Compliance
6. Annual Certification and Contact Information	
Submitted	Compliance
Not submitted	Conditional Compliance

CONDITION	LEVEL
7. New Bridge Documentation	
Submitted on time	Compliance
Submitted after the 90-day window but with all documents	Conditional Compliance
Bridge opened to traffic without notification and/or proper documents	Non-Compliance
8. Failure to Respond to Critical Findings per MD #5	
Acceptable response	Compliance
No response upon any critical finding	Non-Compliance
9. Falsification of Inspection Reports or Bridge Data	
Non-falsified records	Compliance
Falsified records	Non-Compliance
10. Prior Conditional Compliance Status	
Full or substantial compliance previous year	Compliance
Conditional compliance previous year	Non-Compliance
11. Failure to Submit Plan of Corrective Action	
Plan submitted	Compliance
Plan not submitted	Non-Compliance

Loss of Bridge Replacement Funding

If the local bridge owner is found to be in non-compliance, the Off-System Bridge Program Manager and the FHWA will be officially notified with the recommendation that federal funding for the parish be revoked for one year. Evaluation for re-entry into the Off-System Bridge Replacement Program will be completed at the subsequent annual compliance review.

CHAPTER 9:
REFERENCES

CHAPTER 9. REFERENCES

9.1. PRIMARY STANDARDS, MANUALS, AND TECHNICAL ADVISORIES

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CHAPTER 10:
APPENDICES

CHAPTER 10. APPENDICES

A-1: Parts of a Bridge

A-2: Bridge Inventory Form

A-3: Recall Number Request

A-4: Add and Delete Bridges Worksheet

A-5: Form 3097 AssetWise Inspection

A-6: Structure Type Codes

A-7: NBE Element Matrices

A-8: Phase 1 Scour Assessment Form

A-9: Scour Highwater Inspection

A-10: Scour Plan of Action

A-11: Mud Sill Use Guidance

A-12: Critical Finding Form

A-13: DOTD Bridge Closure Notification Form

A-14: Timber Rating Form

A-15: Cross-Sectional Measurements for Load Ratings

A-16: Example CEO Letter

A-17: Movable Bridge Elements

A-18: 2019 Navigation Openings for Movable Bridges

A-19: Movable Bridge List

A-20: Border Bridge List

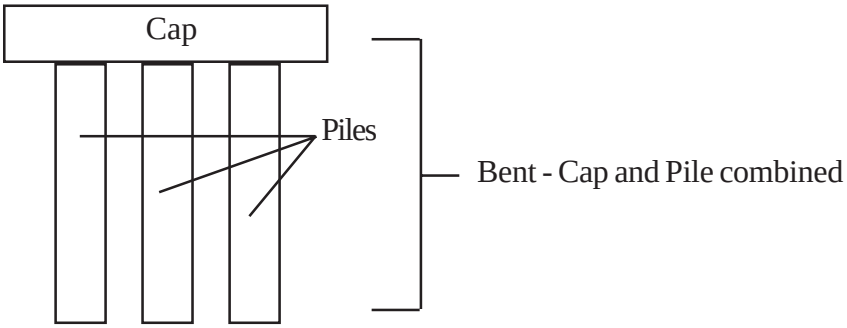
A-1: PARTS OF A BRIDGE

The five major parts of a concrete span bridge

Pile - A concrete post that is driven into the ground to act as a leg or support for the new bridge. It is driven into the ground using a pile-driver. The pile-driver is a machine that acts similar to a hammer hitting a nail and drives the pile into the ground.

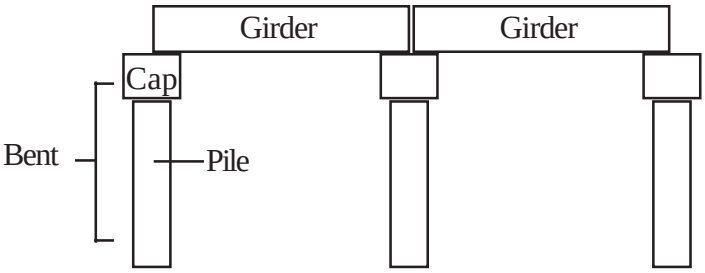
Cap - The cap sits on top of a group of piles and will help disperse pressure to the piles below.

Bent - This is the combination of the cap and the pile. Together, with other bents, act as supports for the entire bridge.



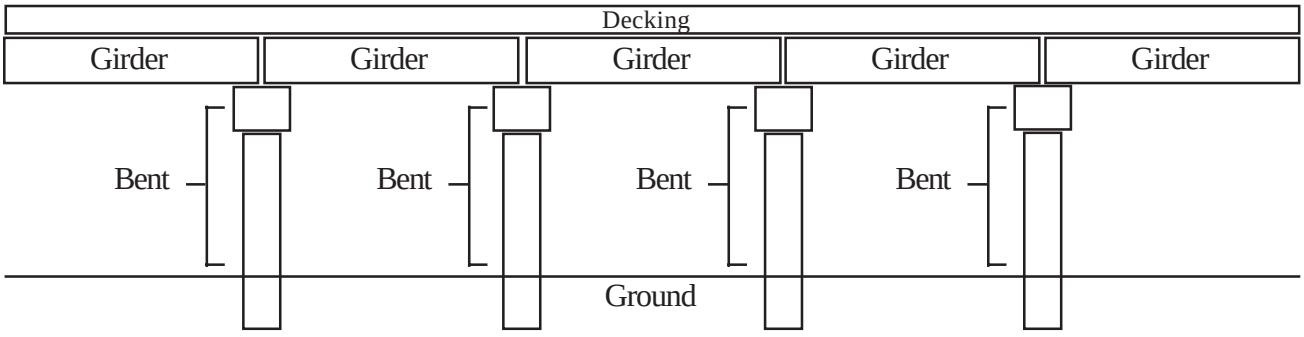
FRONT VIEW

Girders - Girders are like the arms of the bridge. They extend from bent to bent and support the bridge decking. They also help disperse pressure to the bents.



SIDE VIEW

Decking - The decking is what we would consider the road surface of the bridge. It rests on the girders which are supported by the bents that are made up of caps and piles.



A-2: BRIDGE INVENTORY FORM

BRIDGE INVENTORY FORM 1

ASSET/RECALL #

UPDATED TYPE

DIST.

PARISH

ON /OFF

SI&A ITEMS

IDENTIFICATION

(1) STATE CODE	226	(8) STRUC. # (NBI)	
(5) INVENT ROUTE			
(2) DISTRICT		(3) PARISH NAME	
(4) PLACE CODE			
(6) FEATURES INTERSECTED			
(7) FACILITY CARRIED			
(9) LOCATION			
(11) LRS LOGMILE		(12) BASE HWY NETWORK	
(13A) LRS INV ROUTE		(13B) SUBROUTE NUMBER	
(16) LAT		(17) LONG	
(98A) BORDER BR CODE		(98B) % RESPONSIBLE	
(99) BORDER BR STRUC NUMBER			

PROPROSED IMPROVEMENTS

(75A) TYPE WORK PROPOSED		(75B) WORK DONE BY	
(76) LENGTH OF STRUC IMPROVE (ft.)			
(94) BRIDGE IMPROVEMENT COST ($)			
(95) ROADWAY IMPROVEMENT COST ($)			
(96) TOTAL PROJECT COST ($)			
(97) YEAR OF IMPROVE COST EST			
(114) FUTURE ADT		(115) YR OF FUTURE ADT	

INSPECTIONS

(91) ROUTINE INSPEC FREQUENCY	**MONTHS**			
(92A) FRACRTURE CRITICAL INSPEC	(Y/N)		FREQUENCY MONTHS	
(92B) UNDERWATER INSPEC FREQ	(Y/N)		FREQUENCY MONTHS	
(92C) OTHER SPECIAL INSPECTION FREQUENCY	(Y/N)		FREQUENCY MONTHS	

STRUCTURE TYPE AND MATERIAL

(43 A) STRUC TYPE MAIN MATERIAL		(43 B) STRUC TYPE MAIN DESIGN/CONSTRUCTION	
(44 A) STRUC TYPE APPROACH MATERIAL		(44 B) STRUC TYPE APP DESIGN/CONSTRUCTION	
(45) # MAIN SPAN		(46) # APPROACH SPANS	
(107)DECK STR TYPE		(108 A) WEARING SURFACE	
(108 B) DECK MEMB		(108 C) DECK PROTECTION	

LOAD RATING AND POSTING

(31) DESIGN LOAD		(70) BRIDGE POSTING	
(41) STRUCTURE OPEN/POSTED/CLOSED		POSTED LOAD	

AGE OF SERVICE

(27) YEAR BUILT		(106) YEAR RECONSTRUCTED	
(42) SERVICE ON		(42) SERVICE UNDER	
(28) LANES ON		(28) LANES UNDER	
(29) ADT		30)YEAR OF ADT	
(109) ADT TRUCK		(19) BYPASS/DETOUR	

CLASSIFICATION

(112) NBIS BRIDGE LENGTH		(104) NHS INV ROUTE	
(26) FUNCTIONAL CLASS		(100) STRANET HWY DESIGNATION	
(101) PARALLEL STRUCTURE DESIGNATION		(102) DIRECTION OF TRAFFIC	
(103) TEMP STRUCTURE		(105) FEDERAL LANDS HWY	
(110) TRUCK NETWORK		(20) TOLL	
(21) MAINTENANCE RESPONSIBILITY		(22) OWNER	
(37) HISTORICAL		SHPO #	
PRESERVATION CATEGORY			

GEOMETRIC DATA

(48) MAX SPAN (ft.)		(49) TOTAL STRUC. LENGTH (ft)	
50) CURB/SIDEWALK (ft.)	RIGH	LEFT	
(51) CURB-CURB (ft.)		(52) OUT-OUT (ft.)	
(32) APP RDWY WIDTH (ft.)			
(33) BRIDGE MEDIAN		(34) SKEW (DEG)	
(35) STRUC FLARED			
(10) MAX PERMIT HEIGHT (00.0 ft)		(47) TOTAL HORZ. CLEAR	
(53) VERT CLEAR OVER BR RDWY (ft.)			
(54A) VERT UNDER CLEAR REFERENCE		(54B) VERT UNDER CLEAR (00.0 ft)	
(55A) LATERAL UND CLEAR REFERENCE		(55B) LATERAL UNDER CLEAR RIGHT (00.0 ft)	
		(56) LATERAL UNDER CLEAR LEFT (00.0 ft)	

NAVIGATION DATA

(38) NAVIGATION CONTROL		(111) PIER PROTECTION	
(39) NAV VERT CLEAR (ft.)		(116) MIN NAV VERT CLEAR, VERT LIFT BRIDGE (ft.)	
(40) NAV HORIZONTAL CLEAR (ft.)			

DATE 10/2/2019

CREATED BY

ADA SIGN OFF

ASSET/RECALL #

UPDATE TYPE

BRIDGE INVENTORY FORM 2

DIST.

PARISH

ON /OFF

NON-SI&A INVENTORY ITEMS

BRIDGE ID AND LOCATION

CONTROL SEC		ON/OFF		PARISH #	
CS LOG MILE		FACILITY TYPE		PLACE CODE	
BRIDGE ID		PROJ NUMBER			
LA LRS ID		F.A.P. #			
LRS LOGMILE		BRIDGE NAME			
LRS END LOGMILE		END OF BRIDGE LATITUDE		END OF BRIDGE LONGITUDE	

BRIDGE FEATURES

STRUC TYPE NAME		WATERWAY NAME	
TOTAL SPANS		RIVER MILE	
SHARED COST		PIER TO PIER (ft.)	
RAILROAD CODE		RAILIING TYPE NAME	
DIST MAINT BY		SURFACE THICK	

LOAD RATING DATA

DATE RATED			INVENTORY	OPERATING	PV-SINGLE		PV-COMBO	
TYPE RATING		DECK				TONS		TONS
RATING METHOD		SUPER				TONS		TONS
RATED SURF THICK (IN)		SUB				TONS		TONS
		SI&A VALUES					NON-AASHTOWARE PRGM USED	
POSTED LOAD		SI&A METHOD			ASSHTOWARE FILE SAVED			
REQ POSTING								
COND POST								
CEO LIMIT		REMARKS						
CEO DATE								
CEO NUMBER								
REVIEW FLAG		REVIEW REMARKS						
REVIEW DATE								
REVIEWED BY								

HYDRAULICS & SCOUR DATA

(I-113) SCOUR CODE		PILE/COLUMN LENGTH		Ft.
DATE SCOUR RATING		PENETRAT.		Ft.
		ABUTMENT		
		REVETMENT		
		CHANNEL REVETMENT		
SCOUR RATING REMARKS				

PAINT DATA

PAINT PROJ NUMBER		PAINT COLOR CODE	
DATE PAINTED		PAINT CLEAN METHOD	
PAINT SYS			

DATE 10/2/2019

CREATED BY

ADA SIGN OFF

ASSET/RECALL #

UPDATE TYPE

BRIDGE INVENTORY FORM 3

DIST.

PARISH

ON /OFF

UNDER RECORD ITEMS

IDENTIFICATION

(1) STATE CODE	226	(7) FACILITY CARRIED	
(2) DISTRICT		(8) NBI STRUCTURE NUMBER	
(3) PARISH NAME		(9) LOCATION	
(4) PLACE CODE		(11) LRS LOGMILE	
(5A) RECORD TYPE		(12) BASE HWY NETWORK	
(5B) ROUTE TYPE		(13A) LRS INV ROUTE	
(5C) LEVEL OF SERVICE		(13B) SUBROUTE NUMBER	
(5D) ROUTE NUMBER		(16) LATITUDE	
(5E) DIRECTIONAL SUFFIX		(17) LONGITUDE	
(6) FEATURE INTERSECTED			

STRUCTURE TYPE AND MATERIAL

(43A) TYPE OF MATERIAL		(43B) TYPE DESIGN/CONSTRUCTION	

AGE OF SERVICE

(19) BYPASS DETOUR LENGTH		(30) YEAR OF ADT	
(27) YEAR BUILT		(42A) TYPE SERVICE ON BR	
(28A) LANES ON		(42B) TYPE SERV UNDER BR	
(28B) LANES UNDER		(109) ADT TRUCK	
(29) ADT			

GEOMETRIC DATA

(10) MAX PERMIT HEIGHT		(48) LENGTH MAX SPAN	
(47) TOTAL HORIZ CLEAR		(49) STRUCTURE LENGTH	

CLASSIFICATION

(20) TOLL		(102) DIRECTION OF TRAFFIC	
(26) FUNCT CLASS OF INV RT		(103) TEMP STRUCTURE	
(100) STRAHNET HWY		(104) NHS INV RT	
(101 PARALLEL HWY		(110) NATIONAL TRUCK NETWORK	

PERMIT UNDERCLEARANCES

RIGHT ROADWAY			LEFT ROADWAY		
RIGHT CURB (Dir. Of Trav.)		(FT.TN.)	RIGHT CURB (Dir. Of Trav.)		(FT.TN.)
CENTER LINE		(FT.TN.)	CENTER LINE		(FT.TN.)
LEFT CURB		(FT.TN.)	LEFT CURB		(FT.TN.)

LA LRS ID	

DATE 10/02/19

CREATED BY

ADA SIGN OFF

A-3: RECALL NUMBER REQUEST

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

Office of Engineering
PO Box 94245 | Baton Rouge, LA 70804-9245
ph: 225-379-1234| fx: 225-379-1851

John Bel Edwards, Governor
Shawn D. Wilson, Ph.D., Secretary
Christopher P. Knotts, P.E., Chief Engineer

MEMORANDUM

TO: ALL CONSULTANTS
ALL BRIDGE DESIGNERS

FROM: ZHENGZHENG "JENNY" FU, P.E.
BRIDGE DESIGN ENGINEER ADMINISTRATOR

SUBJECT: BRIDGE DESIGN TECHNICAL MEMORANDUM NO. 36.1 (BDTM.36.1)
RECALL NUMBER REQUEST

DATE: FEBRUARY 12, 2019

Revision No. 1 Summary:

The request form and process have been revised and simplified.

Recall Number Request:

Effective immediately, the attached "New / Replacement Recall Number Request Form" shall be completed and submitted to the Bridge Inspection Engineer in the LA DOTD Bridge Maintenance Section for all applicable structures at or prior to 60% Final Plans. This form is also available for download on the Bridge Design website under "Downloads".

If there is no existing structure, the "Existing Structure Number" and "Existing Recall Number" should be marked as "n/a". Provide the "New Structure Latitude" and "New Structure Longitude" at the start of the bridge.

After processing the form, the LA DOTD Bridge Maintenance Section will provide the requestor with the Bridge Recall Number (six digits) and NBI Structure Number (fifteen digits). This number shall be provided by the design engineer in both the rating report and the rating table in the plans.

This technical memorandum is posted on the LA DOTD Website under *Inside La DOTD* > *Divisions - Engineering* > *Bridge Design* > *Technical Memoranda – BDTMs.*

Please contact Kelly Kemp (225-379-1809, kelly.kemp@la.gov) if you have questions or comments.

ZZF/abl

Attachment

Cc: Chris Knotts (Chief Engineer)

Chad Winchester (Chief, Project Development Division)
Edward Wedge (Deputy Engineer Administrator)
Vince Latino (Assistant Secretary of Operations)
David Miller (Chief Maintenance Administrator)
Nick Fagerburg (Bridge Maintenance Administrator)
Michael Vosburg (Chief Construction Division Engineer)
Brian Kendrick (Project Management Director)
Chris Nickel (Pavement and Geotechnical Engineer Administrator)
David Smith (Road Design Engineer Administrator)
Jasmine Galjour (Bridge Maintenance)
Art Aguirre (FHWA)
District Administrators, ADA Engineering, ADA Operations, and District Bridge Engineers and Area Engineers

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

RECALL NUMBER REQUEST FORM

Requested By _____

Date _____

District _____

Parish _____

Existing Structure Number _____

Existing Recall Number _____

New Structure Latitude _____

New Structure Longitude _____

Project Number _____

Project Name _____

To be completed by bridge maintenance

New Recall Number _____

New Structure Number _____

Processed By _____

Date _____

A-4: ADD AND DELETE BRIDGES WORKSHEET

ADD/DELETE

DIST. _____

PARISH _____

ON/OFF _____

CONTROL SECTION _____

LOGMILE _____

BRIDGE ID _____

ROUTE _____

FEATURE CROSSED _____

PROJECT # _____

ADD _____ (YES/NO)
NEW RECALL # _____
STRUCTURE TYPE _____
LENGTH _____

DELETE _____ (YES/NO)
EXISTING RECALL # _____
STRUCTURE TYPE _____
LENGTH _____

REMARKS : _____

_____

_____

1/18/2019
DATE

_____
COMPLETED BY
(FULL NAME)

_____
ADA OF OPERATIONS
(SIGNATURE)

A-5: FORM 3097 ASSETWISE INSPECTION

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION & DEVELOPMENT
BRIDGE INSPECTION REPORT

INPECTTECH
Rev. 05/2017

PAGE 1 OF _____

DISTRICT	PARISH	ROUTE	CNT-SCT	LOGMILE	ID	RECALL NUMBER

CROSSING DESCRIPTION	LENGTH	BRIDGE TYPE	YEAR BUILT	POSTED LOAD
				-

CONDITION

DECK : _____ CHANNEL : _____

SUPERSTRUCTURE : _____ CULVERT : _____

SUBSTRUCTURE : _____

INSPECTION

DATE: _____

TYPE: _____

NEXT: _____

APPRAISAL

WATERWAY ADEQ : _____ BRIDGE RAILINGS : _____ GUARDRAIL ENDS : _____

APPROACH ALIGN : _____ TRANSITIONS : _____ PIER PROTECTION : _____

SURFACE THICKNESS : _____ APPR GUARDRAIL : _____

SPECIAL DETAILS

PIN & HANGER ASSEMBLY : _____

2-GIRDER SYSTEM : _____

2-TRUSS SYSTEM : _____

SUSPENDED SPANS : _____

X-GIRDER/FLR BEAMS : _____

STEEL PIER CAPS : _____

ACCESS EQUIPMENT (HRS)

UNDER BRIDGE INSP VEH : _____

BUCKET TRUCK/MANLIFT : _____

MARSH BUGGY : _____

SCAFFOLDING : _____

BOAT : _____

LADDER : _____

ATTACHMENTS Y/N

SKETCHES: _____

PHOTOGRAPHS: _____

STREAMBED PROFILE: _____

TIMBER RATING: _____

OTHER LOAD RATING: _____

CORRESPONDENCE: _____

PERSONNEL RESOURCES

NO. OF INSPECTORS : _____

MAN HOURS : _____

TEAM LEADER INITIALS : _____

INSPECTED BY : _____

APPROVED BY : _____

DATE APPROVED : _____

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION & DEVELOPMENT
BRIDGE INSPECTION REPORT

STR UNIT: ________ **RECALL NO.** 0 PAGE ____ OF ____

ELEMENT CONDITIONS AND NOTES

ELEM DESCRIPTION					
		QUANTITY STATE			
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

ELEM DESCRIPTION					
		QUANTITY STATE			
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

ELEM DESCRIPTION					
		QUANTITY STATE			
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION & DEVELOPMENT
BRIDGE INSPECTION REPORT

STR UNIT: ____________ **RECALL NO.** 0 PAGE ______ OF ______

ELEMENT CONDITIONS AND NOTES

ELEM DESCRIPTION					
			QUANTITY STATE		
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

ELEM DESCRIPTION					
			QUANTITY STATE		
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

ELEM DESCRIPTION					
			QUANTITY STATE		
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION & DEVELOPMENT
BRIDGE INSPECTION REPORT

STR UNIT: ________ **RECALL NO.** 0 PAGE ____ OF ____

ELEMENT CONDITIONS AND NOTES

ELEM DESCRIPTION					
			QUANTITY STATE		
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

ELEM DESCRIPTION					
			QUANTITY STATE		
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

ELEM DESCRIPTION					
			QUANTITY STATE		
TOTAL QTY UNITS	1	2	3	4	
		0	0	0	

NOTES:

DEFECTS	QTY CS 2	QTY CS 3	QTY CS 4

INSPECTION NOTES : **RECALL NO.** 0 PAGE _____ OF _____

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
BRIDGE INSPECTION REPORT

INSPECTTECH
Rev. 05/2017

TIMBER LOAD RATING FIELD MEASUREMENTS

RECALL	SPAN	STURCTURE TYPE	DATE OF INSPECTION	TYPE FLOORING	BRIDGE HAS TIMBER SPANS ONLY? T(RUE) OR F(ALSE)
0			01/00/00		

PAGE ____ OF ____

DECK THICKNESS (IN. AND THS.)	DECK PLANK WIDTH (IN. AND THS.)	WEARING COURSE (IN. AND THS.)	RDWY WIDTH (FT. AND THS.)	SPAN LENGTH (FT. AND THS.)	CAP DEPTH (IN. AND THS.)	CAP WIDTH (IN. AND THS.)

	GIRDER DEPTH (IN. & THS.)	GIRDER THICKNESS (IN. & THS.)	DISTANCE TO NEXT CENTER TO CENTER (IN. & THS.)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
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26			
27			
28			
29			
30			

	PILE SPACING SPACING (FT. AND THS.)	PILE CIRC. (IN. AND THS)	PILE SHELL THICKNESS (IN AND THS.)	PILE LENGTH LENGTH (FT. AND THS.)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
BRIDGE INSPECTION REPORT

INSPECTTECH
Rev. 05/2017

Date: 0 PAGE _____ OF _____

STREAMBED PROFILE

RECALL NO. 0

Orientation to Roadway (LEFT/RIGHT) _____
Orientation to Waterway (UPSTREAM / DOWNSTREAM) _____

Feature measured to: Top of _____
Dist to top of water: _____

Slope protection: _____
Type: _____

Channel Protection: _____
Type: _____

Dist from Feature to Bottom of Cap _____

Bent No.	Distance from beginning of structure	Streambed Measurement

A-6: STRUCTURE TYPE CODES

Rev. 06/06/2018

LADOTD Structure Type Names

	NAME	DESCRIPTION
Timber Spans		
	TTTRES	Treated Timber Trestles
	TTTCOF	Treated Timber Trestles (w/ Concrete Deck)
	TTMUDS	Treated Timber Mud Sill
	TTTLAM	Treated Timber Trestles (w/ Laminated Deck and/or Stringers)
Timber & Steel Spans		
	CIBTTF	Timber Trestle w/ I-Beam Stringers (w/ Timber Deck)
	CIBTCF	Timber Trestle w/ I-Beam Stringers (w/ Concrete Deck)
	CIBTTM	Timber Trestle w/ I-Beam Stringers (Removable Span)
Concrete Girder/Slab Spans		
	COSLAB	Concrete Slab
	LWSLAB	Lightweight Concrete Slab
	CNTSLB	Concrete Slab - Continuous
	COPCSS	Concrete Precast Slab Units
	LWPCSS	Lightweight Concrete Precast Slab Units
	CPCSSC	Concrete Precast Slab Span w/ Closure Pours
	CPSCCD	Concrete Prestressed Slabs w/ Continuous Cast-In-Place Deck
	COPSCH	Concrete Prestressed Channel Units (Welded)
	CORECH	Concrete Precast Reinforced Channel Units (Bolted)
	COPVCD	Concrete Precast Voided Units w/ Cast-In-Place Deck
	COVSLB	Concrete Voided Slab
	CCOVSL	Concrete Voided Slab - Continuous
	CODEKG	Concrete Deck Girder
	CNTCDG	Concrete Deck Girder - Continuous
	COPSGR	Concrete Prestressed Girders (AASHTO Type)
	PSGRLW	Concrete Prestressed Girders (AASHTO Type) w/ Lightweight concrete deck
	CPGCCD	Concrete Prestressed Girders (ASSHTO Type) w/Continuity Diaphragms & Continuous Cast-In-Place Deck
	CPGLSD	Concrete Prestressed Girders (ASSHTO Type) w/ Linked Slab Continuous Deck
	PCPSSP	Concrete Prestressed Girders (AASHTO Type) w/Precast Monolithic Deck
	COBTGR	Concrete Prestressed Bulb Tee Girders (BT Type)
	CBTGCD	Concrete Prestressed Bulb Tee Girders (BT Type) w/Continuous Cast-In-Place Deck
	CPSQBG	Concrete Prestressed Quad-Beam Girder
	CPQCCD	Concrete Prestressed Quad-Beam Girder w/Continuous Cast-In-Place Deck
	COLGGR	Concrete Prestressed Louisiana Girder (LG Type)
	CLGGCD	Concrete Prestressed Louisiana Girder (LG Type) w/Continuous Cast-In-Place Deck
	COBXGR	Concrete Box Girder
	COBXBM	Concrete Box Beam
	CBXSEG	Concrete Box Girder - Segmental
	CONRCH	Concrete Arch
Movable Spans		
	HISWNG	Steel High Truss Swing Span
	LOSWNG	Steel Low Truss Swing Span
	PGSWNG	Steel Plate Girder Swing Span
	IBSWNG	Steel I-Beam Swing Span
	TRBASC	Steel Truss Bascule Span
	PGBASC	Steel Plate Girder Bascule Span
	STVERT	Steel Tower Vertical Lift Span
	COVERT	Concrete Tower Vertical Lift Span
	PONTON	Pontoon Bridge

Rev. 06/06/2018

LADOTD Structure Type Names

	NAME	DESCRIPTION
Culverts		
(Over 20ft total opening)	CONBOX	Concrete Box Culvert(s)
	COPBOX	Precast Concrete Box Culvert(s)
	CONPIP	Concrete Pipe Culvert(s)
	CFRCLV	Concrete Frame Culvert(s)
	STLRCH	Steel/Metal Arch Culvert(s)
	ALURCH	Aluminum Arch Culvert(s)
	STLPIP	Steel/Metal Pipe Culvert(s)
	ALUPIP	Aluminum Pipe Culvert(s)
	RRTKCR	Railroad Tank Car(s)
	RRBXCR	Railroad Box Car(s)
	PLARCH	Plastic Pipe Culvert(s)
Steel Girder Spans		
	CONIBM	Steel I-Beam (Rolled)
	CNTIBM	Steel I-Beam (Rolled) - Continuous
	SUSIBM	Steel I-Beam (Rolled) - Suspended
	CORIBM	Steel I-Beam (Rolled) - Removable Span
	COMWEL	Welded I-Beam w/ Composite Concrete Deck
	CMWLLW	Welded I-Beam w/ Composite Lightweight Concrete Deck
	CNTWEL	Welded I-Beam w/ Composite Concrete Deck - Continuous
	IBMWEL	Welded I-Beam w/ Steel Bents and Floor
	STPLGR	Steel Plate Girder
	STCPLG	Steel Plate Girder - Continuous
	SUSPLG	Steel Plate Girder - Suspended
	STCAPG	Steel Plate Girder (Cable Stayed)
	STCUGR	Steel Curved Plate Girder
	STBXGR	Steel Box Girder
	SSTBXG	Steel Box Girder (Single or Spread)
	STCAGR	Steel Box Girder (Cable Stayed)
	STCUBX	Steel Curved Box Girder
Truss Spans		
	STHITR	Steel High Truss (Simple Through Truss)
	STCANT	Steel High Truss (Cantilevered Through Truss)
	STLOTR	Steel Low Truss (Pony Truss)
	STDKTR	Steel Deck Truss
Miscellaneous Structures		
	RRFLCR	Railroad Flat Car
	PEDXNG	Pedestrian Walkway
	BAILEY	Bailey, ACRO, or other "Portable Army Type" Bridging
	FERRYT	Ferry - Toll
	TUNNEL	Tunnel or Subway
	OTHERS	* Combination of Type of Construction and/or Material IN SAME SPAN, such as a CODEKG "widened" using Timber Pile and Precast Span Units. * This code will only be used in special situations, and only as directed by the Structures & Facilities Maintenance Engineer.

A-7: NBE ELEMENT MATRICES

1. NBE - Deck & Slabs

Element	Units	Decks	Slab	Other
Deck/Slab - Reinforced Concrete	Area (sq. ft.)	12	38	
Deck/Slab - Prestressed Concrete	Area (sq. ft.)	13	39	
Top Flange - Prestressed Concrete	Area (sq. ft.)	15		
Top Flange - Reinforced Concrete	Area (sq. ft.)	16		
Steel Deck—Open Grid	Area (sq. ft.)	28		
Steel Deck—Concrete Filled Grid	Area (sq. ft.)	29		
Steel Deck—Corrugated / Orthotropic/Etc.	Area (sq. ft.)	30		
Deck/Slab - Timber	Area (sq. ft.)	31	54	
Deck/Slab - Other	Area (sq. ft.)	60	65	

2. NBE - Railings

Element	Units	Steel	Prestressed Concrete	Reinforced Concrete	Timber	Masonry	Other
Bridge Railing – Metal	Length (ft.)	330					
Bridge Railing - Reinforced Concrete	Length (ft.)			331			
Bridge Railing - Timber	Length (ft.)				332		
Bridge Railing - Other	Length (ft.)						333
Bridge Railing - Masonry	Length (ft.)					334	

3. NBE - Superstructure

Element	Units	Steel	Prestressed Concrete	Reinforced Concrete	Timber	Masonry	Other
Closed Web/Box Girder	Length (ft.)	102	104	105			106
Girder / Beam	Length (ft.)	107	109	110	111		112
Truss	Length (ft.)	120			135		136
Arch	Length (ft.)	141	143	144	146	145	142
Stringer	Length (ft.)	113	115	116	117		118
Floor Beam	Length (ft.)	152	154	155	156		157
Cable - Main	Length (ft.)	147					
Cable – Secondary	Each	148					149
Pin and Pin & Hanger Assembly	Each	161					
Gusset Plate	Each	162					
Railroad Car Frame	Length	170					
Miscellaneous Steel Superstructure	Each	171					
EQ Restrainer Cables	Each	180-					

4. NBE - Bearings

Element	Units	Steel	Prestressed Concrete	Reinforced Concrete	Timber	Masonry	Other
Elastomeric	Each						310
Moveable (roller, rocker, sliding)	Each						311
Enclosed / Concealed	Each						312
Fixed	Each						313
Pot	Each						314
Disk	Each						315
Other	Each						316

5. NBE - Substructure

Element	Units	Steel	Prestressed Concrete	Reinforced Concrete	Timber	Masonry	Other
Abutment	Length (ft.)	219		215	216	217	218
Pier Cap	Length (ft.)	231	233	234	235		236
Columns	Each	202	204	205	206		203
Tower / Trestle	Length (ft.)	207			208		
Pier Wall	Length (ft.)			210	212	213	211
Pile Cap / Footing	Length (ft.)			220			
Pile	Each	225	226	227	228		229
Pile – Cast-In-Steel-Shell	Each	251					
Pile – Cast-In-Drilled-Hole	Each			252			
Seismic Column Shells (Full Height)	Each	254					
Seismic Column Shell (Partial Height)	Each	255					
Slope / Scour Protection	Each						256

6. NBE - Culverts

Element	Units	Steel	Prestressed Concrete	Reinforced Concrete	Timber	Masonry	Other
Culvert	Length (ft.)	240	245	241	242	244	243
Tunnels	Length (ft.)						250

7. BME – Joints

Element	Units	Element Number
Joint - Strip Seal Expansion	Length (ft.)	300
Joint - Pourable Seal	Length (ft.)	301
Joint - Compression Seal	Length (ft.)	302
Joint – Assembly with Seal	Length (ft.)	303
Joint - Open Expansion	Length (ft.)	304
Joint - Assembly without Seal	Length (ft.)	305
Joint - Other	Length (ft.)	306
Joint - Asphaltic Plug	Length (ft.)	307
Joint – Steel Sliding Plates	Length (ft.)	308
Joint - Steel Fingers	Length (ft.)	309

8. BME – Approach Slabs

Element	Units	Element Number
Approach Slab - Prestressed Concrete	Area (sq. ft.)	320
Approach Slab - Reinforced Concrete	Area (sq. ft.)	321

9. BME – Wearing Surface, Protective Coatings and Concrete Reinforcing Steel Protective Systems

Element	Units	Element Number
Deck Wearing Surface - Asphaltic Concrete	Area (sq. ft.)	510
Deck Wearing Surface – Concrete (Polyester)	Area (sq. ft.)	511
Deck Wearing Surface - Epoxy	Area (sq. ft.)	512
Deck – Wearing Surface - Timber	Area (sq. ft.)	513
Steel Protective Coating - Paint	Area (sq. ft.)	515
Steel Protective Coating - Galvanization	Area (sq. ft.)	516
Steel Protective Coating - Weathering Steel	Area (sq. ft.)	517
Reinforcing Steel Protective System - Rebar Coating / Cathodic	Area (sq. ft.)	520
Concrete Protective Coating - Methacrylate / Sealer	Area (sq. ft.)	521
Deck Membrane	Area (sq. ft.)	522

A-8: PHASE 1 SCOUR ASSESSMENT FORM

S.P. No: FAP. No: Date:	**PHASE 1 SCOUR ASSESSMENT OF BRIDGES OVER WATERWAYS**	DISTRICT: PARISH: STRUCT. No.:

Stream Name: **Route:** **Func. Class:**

SIA Item 113 Worksheet

____ Unknown Foundation (U)

____ Bridge Not Over Water (N)

____ Scour Stable (8)

- ____ Min. pile penetration of 50%, 20-ft minimum (drainage area < 10-sq mi)
- ____ Min. pile penetration of 50%, 25-ft minimum (10-sq mi < drainage area < 25-sq mi)
- ____ Min. pile penetration of 50%, 25-ft min;if Q lies in shaded area (25-sq mi < drainage area < 100-sq mi)
- ____ Engineering Judgment (See Notes/Report)
  - ☐ Drainage area <= 2-sq mi
  - ☐ No history of scour (from available records)
  - ☐ Bridge service life >= 20-yrs
  - ☐ Not on Interstate/NHS Route
  - ☐ No significant signs of lateral/vertical instability

____ Scour Susceptible (6), scour evaluation (Phase 2) required

- ____ Pile penetration less than 50%
- ____ Pile penetration less than 20-ft (drainage area < 10-sq mi)
- ____ Pile penetration less than 25-ft (drainage area > 10-sq mi)
- ____ Q lies outside Discharge/Drainage Area diagram, (25-sq mi < drainage area < 100-sq mi)
- ____ Drainage area greater than 100-sq mi

____ Scour Critical (3 or less) NBIS Item 113 Rating: _____

Phase I NBIS Item 113 Rating

Notes:

Contributing Engineer:

Confirming Engineer:

A-9: SCOUR HIGHWATER INSPECTION

STATE OF LOUISIANA

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Rev. 08/2017

SCOUR/HIGH WATER INSPECTION REPORT

Recall # ____________________

District: ____________________

Parish: ______________________________

Date : ____________________

On / Off: ____________________

Bent No.	Distance from beginning of structure	Streambed Measurement

Orientation to Roadway : ____________________
(LEFT/RIGHT)

Orientation to Waterway : ____________________
(UPSTREAM / DOWNSTREAM)

Feature measured to Top of : ____________________

Dist from Feature to Bottom of Cap : ____________________

Dist to top of water : ____________________

Pile Type : ____________________

Active Scour : YES or NO
(Including Abutments & Approach Rdwy) (If yes, explain in notes)

Debris : YES or NO
(If yes, explain in notes)

Overtopping : YES or NO

Notes : ____

____

____

____

____

____

____

Photos Taken : YES or NO

Further Review Needed : YES or NO

Inspected By : ______________________________________
(Full Name)

____

____

A-10: SCOUR PLAN OF ACTION

Scour Plan of Action

1. General Information

Recall

District

Structure Number

Parish

Features Intersected

Owner

Facility Carried

Year Built

Location

ADT

Year ADT

2. Scour Vulnerability

I113

Date Scour Rating **I60**

Pile Length **Ft.** **I61**

Penetration **Ft.** **I71**

Abut Revetment

Chan Revetment

Scour Rating Remarks

Overtopping ☐ **Evacuation Route** ☐

Debris ☐ **Scheduled Replacement** ☐

Scour Project Number

Scour Vulnerability and Countermeasure Notes

Detour Route Notes

3. Monitoring and Closure

Responsible Party

Title

Phone

Email

Monitoring Frequency

Monitoring Method and Criteria

Action if High Water Event Occurs

Closure Policy/Criteria to Reopen

Inspector:

Structure Number:

Inspection Date:

Facility Carried:

Bridge Inspection Report

Location Map

A-11: MUD SILL USE GUIDANCE

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

INTRADEPARTMENTAL CORRESPONDENCE

REFERRED TO

_____
_____
_____

_____ REFERRED FOR ACTION
_____ ANSWER FOR MY SIGNATURE
_____ FOR FILE
_____ FOR YOUR INFORMATION
_____ FOR SIGNATURE
_____ RETURN TO ME
_____ PLEASE SEE ME
_____ PLEASE TELEPHONE ME
_____ FOR APPROVAL
_____ PLEASE ADVISE ME
_____ _____

BY _____ DATE _____
BY _____ DATE _____
BY _____ DATE _____

MEMORANDUM

TO: DISTRICT BRIDGE INSPECTION OFFICES

FROM: DAVID MILLER, P.E. David H. Miller

DATE: OCTORBER 24, 2013

SUBJECT: MUD SILLS

As bridges come up for their routine inspection or bridge rating, the use of existing mud sills should be evaluated for consistency with the guidance from this memorandum.

Because of the uncertainty in calculating the capacity of mud sills, their use will be phased out over time and should only be used as a last resort on temporary repairs not to exceed 12 months. There are many repair methods that function better and can be backed up with engineering data to support the repair methodology.

Criteria for use of mud sill are listed below:

- Heights of 5 feet or less
- If inundated do not use
- Should not be used on scour susceptible waterways
- Full bearing between the cap and the ground
- Mud sill usage should be limited to abutments. They should also be limited to portions of the abutment and not the entire abutment.

If there are extenuating circumstances that arise that are not covered in the memorandum, please contact the Section 51 office for further guidance.

cc: Vince Latino

_____ _____
RECOMMENDED FOR APPROVAL DATE

_____ _____
RECOMMENDED FOR APPROVAL DATE

_____ _____
RECOMMENDED FOR APPROVAL DATE

_____ _____
APPROVED DATE

A-12: CRITICAL FINDING FORM

OFF-SYSTEM
CRITICAL DEFICIENCY
FOLLOW-UP CHECKLIST

STRUCTURE/RECALL NUMBER	REASON CODE	ORIGINAL NOTICE DATE	FINAL NOTICE DATE	RESPONSE REQUIRED DATE	ACCEPTED RESPONSE DATE	NON-COMP WITH NBIS DATE	NAME/TITLE OF PERSON NOTIFIED - REMARKS

STRUCTURE SYSTEM

OFF-SYSTEM BRIDGES – CRITICAL DEFICIENCY – FOLLOW-UP

CODING INSTRUCTIONS:

REASON:

Enter the appropriate REASON CODE for the notification being given to the Off-System Bridge Owner according to the Reason Codes listed below.

PERSON NOTIFIED:

Enter the NAME and TITLE of the Bridge Owner, or his representative, who was initially contacted and advised of the critical situation requiring the bridge be closed.

ORIGINAL NOTIFICATION – DATE & TIME:

Enter the DATE and TIME the above person was first notified of the critical deficiencies. This shall be the initial notification (first contact) by phone or in person, which shall be followed by a Certified Letter.

Press ENTER now, and the computer will calculate the Date a Response is required and the Date of Non-Compliance With NBIS based on the Reason Code entered above and the Date of Original Notification.

FINAL NOTIFICATION – DATE & TIME:

Enter the DATE and TIME the Bridge Owner received the Final Notification that critical deficiencies exist, and that a response is required. This shall be the final notification (personal contact) by phone or in person, which shall also be followed by a Certified Letter.

ACCEPTABLE RESPONSE RECEIVED:

Enter the DATE and TIME an Acceptable Response was received from the Bridge Owner.

COMMENTS/REMARKS:

Enter up to 70 characters of comments or remarks as necessary.

The following Reason Codes shall be used to indicate the reason the Off-System Bridge Owner has been notified.

REASON FOR NOTIFICATION:	REASON CODE:
Bridge recommended for CLOSURE based on findings of an LA DOTD Bridge Inspector	CI
Bridge recommended for CLOSURE based on LA DOTD Timber Rating calculations.	CR
Bridge recommended for LOAD POSTING based on the findings of an LA DOTD Bridge Inspection.	PI

Bridge recommended for LOAD POSTING based on LA DOTD Timber Rating Calculations.	PR
Bridge requires CLOSURE, but during the ANNUAL REVIEW the bridge was found Not Closed.	RC
Bridge requires LOAD PSOTING, but during ANNUAL REVIEW the bridge was Found Not Properly Posted.	RP
Bridge requires CLOSURE, but during a SPOT CHECK the bridge was found Not Closed.	SC
Bridge requires LOAD POSTING, but during a SPOT CHECK the bridge was found Not Properly Posted.	SP
Bridge has Concrete or Steel spans which have NOT been RATED, and must be rated By the Owner's Engineer.	NR
COMPUTER LISTINGS indicate bridges which:	CL

1) should be closed but are still open, and/or
2) are not properly posted, and/or
3) have other inconsistent or missing rating, posting, or closing data.

EXAMPLE NO. 1

A bridge has been recommended for CLOSURE based on the findings of an LA DOTD Bridge Inspection. The current date (for purposes of this example) is April 1, 1992. The Bridge Owner was contacted today at 1:00 PM.

When you get back to the office, call up the structure in STRM and enter the following Information on MSF-Segment 15:

-ACTION = "A" (or "C" to change or correct a mistake)
-REASON CODE = "CI"
-ORIGINAL NOTIFICATION-DATE /TIME = "04/01/92 01:00 PM"

Press Enter and the computer will calculate the following dates for you:

-RESPONSE REQUIRED FROM OWNER = "04/08/92"
-DATE OF NON-COMPLIANCE WITH NBIS = "04/15/92"

One week later, an Acceptable Response was received from the Bridge Owner at 9:00 AM On 04/07/92, therefore enter the following on MSF-Segment 15:

-ACCEPTABLE RESPONSE RECEIVED-DATE/TIME IS "04/07/92 09:00 AM"

Press Enter and the computer will erase RESPONSE REQUIRED FROM OWNER and DATE OF NON-COMPLIANCE WITH NBIS, because a proper response has been received within the specified time Frames.

EXAMPLE NO. 2

During a trip across the Parish you noticed that a bridge which was recommended for CLOSURE last year is still OPEN to traffic. The current date (for purposes of the example) Is April 1, 1992.

When you get back to the office, call up the structure in STRM and enter the following Information MSF-Segment 15:

-ACTION = "A" (or "C" to change or correct a mistake)
-REASON CODE = "SC"
-ORIGINAL NOTIFICATION-DATE TIME = "04/01/92 03:30 PM"

Press Enter and the computer will calculate the following dates for you:

-RESPONSE REQUIRED FROM OWNER = "04/08/92"
-DATE OF NON-COMPLIANCE WITH NBIS = "04/08/92"

An Acceptable Response was NOT RECEIVED from the Bridge Owner by 04/08/92, therefore A Certified Letter must be sent to the Bridge Owner informing him of his status of Non-Compliance With NBIS.

KEEPING UP WITH THE NOTIFICATION PROCESS:

After notifying an Off-System Bridge Owner that a bridge contains critical deficiencies which require Immediate attention, the first thing to do upon returning to the office is to update this screen on the Master Structure File.

After a REASON and an ORIGINAL NOTIFICIATION DATE have been entered on the screen, press Enter. The computer will then automatically calculate, depending on which Reason Code has been entered, the DATE a RESPONSE is required from the Bridge Owner and the DATE of NON-COMPLIANCE WITH NBIS, should the Owner fail to respond.

When the Current Date becomes equal to the Date Response Required (either 7 or 30 days after Date Original Notification), the Owner must be given a Final Notification to respond. When this notice is given, the DATE FINAL NOTIFICATION shall be entered on the screen and on the Follow-up Checklist.

When the Current Date becomes equal to the Date of Non-Compliance with NBIS (either 7,14, or 37 days after Date Original Notification), the Owner is officially, irrevocably in Non-Compliance with the NBIS and is prohibited from participation in the program for at least one full calendar year.

A-13: DOTD BRIDGE CLOSURE NOTIFICATION FORM

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

INTRADEPARTMENTAL CORRESPONDENCE

BRIDGE CLOSURE NOTIFICATION

CLOSURE DATE _____

DISTRICT _____

PARISH NAME _____

BRIDGE TYPE _____

RECALL NUMBER _____

ROUTE _____

CROSSING _____

YEAR BUILT _____

ADT _____

PRECLOSURE POSTED LOAD _____

DEFICIENCIES PROMPTING CLOSURE

ATTACH PHOTOS OF DEFICIENCIES CLOSING THE BRIDGE AND MAP SHOWING BRIDGE LOCATION.

A-14: TIMBER RATING FORM

FORM 104P
REV. 8/30/ 2007

LOUISIANA DOTD

STRUCTURAL RATING OF TIMBER STRINGER SPANS
FIELD DATA AND MEASUREMENT FORM
OFF SYSTEM BRIDGE

Span _____ of _____

RECALL NUMBER	SPAN	STRUCTURE TYPE	DATE OF INSPECTION	TYPE FLOORING	BRIDGE HAS TIMBER SPANS ONLY? T(RUE) OR F(ALSE)	STRUCTURE NUMBER P/U	PAR.	LATITUDE	LONGITUDE	ID

DECK THICKNESS (IN. & HDTHS.)	DECK PLANK WIDTH (IN. & HDTHS.)	WEARING COURSE (IN. & HDTHS.)	ROADWAY WIDTH (FT. & HDTHS.)	SPAN LENGTH (FT. & HDTHS.)	CAP DEPTH (IN. & HDTHS.)	CAP WIDTH (IN. & HDTHS.)	PILE LENGTH (FT. & HDTHS.)	PILE CIRCUM-FERENCE (IN. & HDTHS.)	PILE SHELL THICKNESS (IN. & HDTHS.)
.	.	.	.	.	.	.	.	.	.

	STRINGER DEPTH (IN. & HDTHS.)	STRINGER THICKNESS (IN. & HDTHS.)	DIST TO NEXT CENT - CENT (IN. & HDTHS.)
1	.	.	.
2	.	.	.
3	.	.	.
4	.	.	.
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20	.	.	.
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22	.	.	.
23	.	.	.
24	.	.	.
25	.	.	.

PILE SPACING (FT. & HDTHS.)
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NOTE: All dimensions MUST be coded in inches and hundredths of an inch or feet and hundredths of a foot.

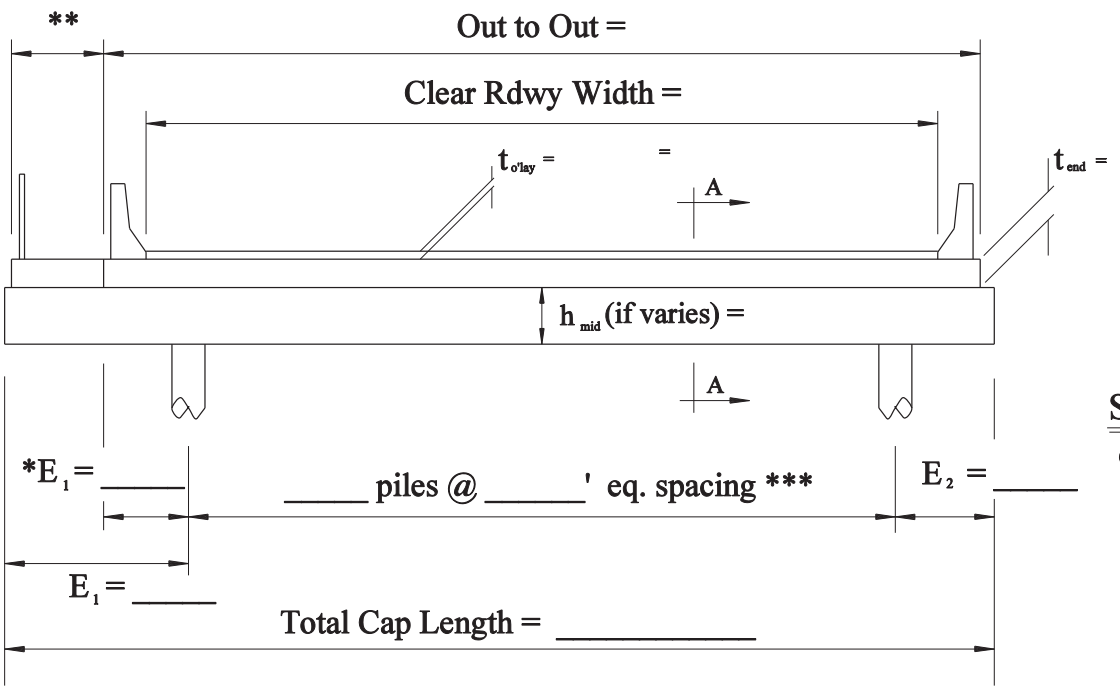
1. Start coding datain the left, numbered block for each item.
2. A decimal is required in a block for each measured item.
3. Code all letters in upper case print.
4. Use a separate coding form for each type of span on a bridge. Spans with cracked, different sized or number of stringers are different types.
5. Code structure type being rated (TTTRES, TTMUDS, TTTCOF, UTTRES, UTMUDS, or TTTLAM)
6. Code the flooring type: CONCRETE, STRIP (tongue & groove), or PLANK.
7. If no other span types exist exist on the bridge than timber stringer spans coded, code T for True.
8. Leave Pile shell thickness blank if it is solid. A shell thickness of 0.0 is equivalent to a solid pile.
9. When coding stringers, code each effective stringer in the span. The "center / center" distance for the last (outside) stringer is coded 0.0
10. When coding piles, code each effective pile in the bent. The "center / center" distance for the last (outside) pile is coded 0.0

A-15: CROSS SECTIONAL MEASUREMENTS FOR LOAD RATINGS

Sht ___ of ___

Bridge Recall # _____
Bridge Name _____
Parish _____

Bent Spacing/Span Length =

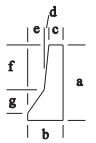


Section A-A
Cap Cross Section

Cap:
Material: ☐ Concrete ☐ Timber ☐ Steel
w = ____ h = ____

Piles:
Material: ☐ Concrete ☐ Timber ☐ Steel H Pile
Size:

Barrier Type



Jersey Type

a	b	c	d
e	f	g	

Deep Beam Type

Post Material		Post Size		Post Spacing
Steel	Wood	w	d	Ctr to Ctr

w = width d = depth

Other - Describe

* If no Sidewalk
** Include sidewalk info if applicable
*** If not equal spacing, provide individual spacing

Legend
t_{end} = End Slab Thickness
t_{mid} = Mid Span Slab Thk.
$t_{o'lay}$ = Overlay Thickness
w = Cap Width
h = Cap Height
E_1 = Left Edge Dist
E_2 = Right Edge Dist

Typical Concrete Slab Bridge

Bridge Skew = ☐ 90° ☐ 75° ☐ 60° ☐ 45°

For Precast Slab Bridges

Panel Dates	Precast Panels	
	Exterior Panel Width	Interior Panel Width

Provide any Additional Applicable Information

Bent Spacing/Span Length =

Sht ___ of ___

Bridge Recall # _____

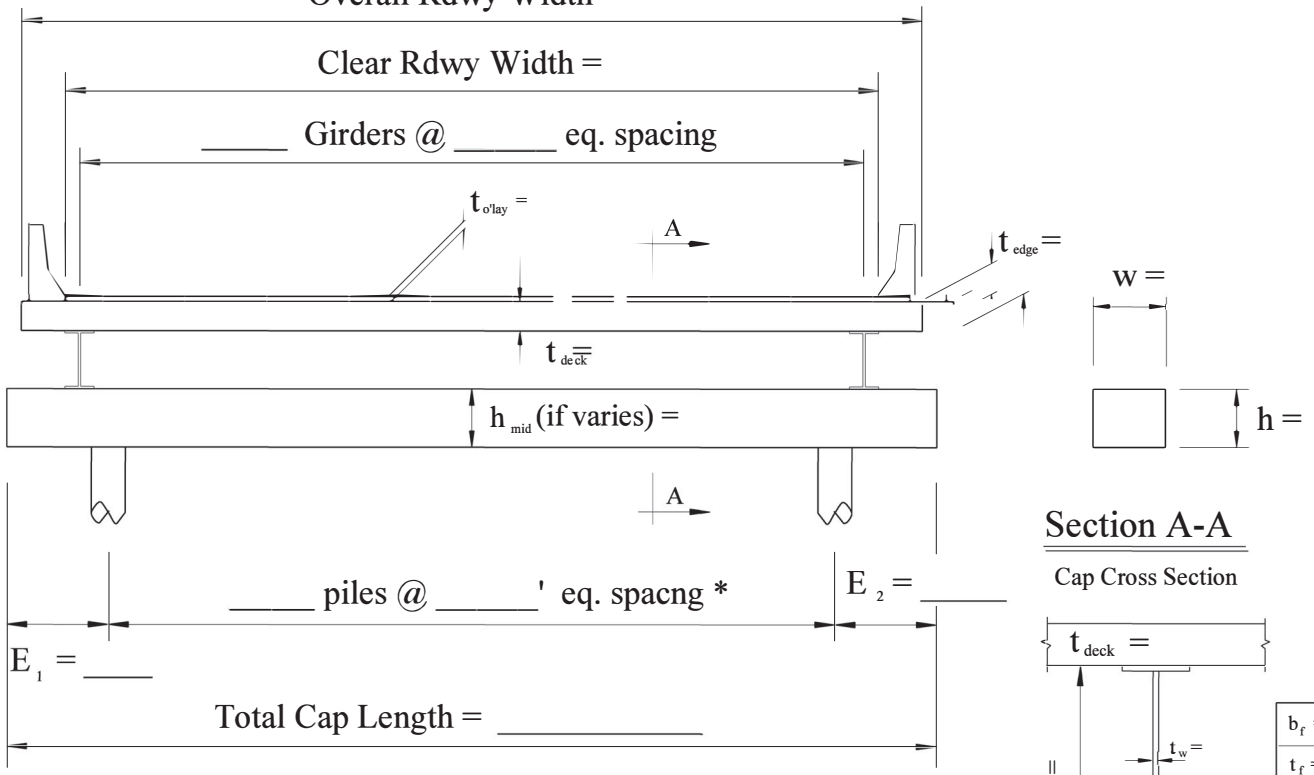
Bridge Name _____

Parish _____

Overall Rdwy Width =

Clear Rdwy Width =

_____ Girders @ _____ eq. spacing



* If not equal spacing, provide individual spacing

Typical Girder Type Bridge

Bridge Skew = ☐ 90° ☐ 75° ☐ 60° ☐ 45°

Cap:		Piles:	
	☐ Concrete		☐ Concrete
Material:	☐ Timber	Material:	☐ Timber
	☐ Steel		☐ Steel H Pile
w = ____ h = ____		Size:	

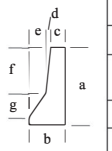
Section A-A

Cap Cross Section

b_f = Flange Width
t_f = Flange Thk.
t_w = Web Thk.

Barrier Type

Jersey Type



a	b	c	d
e	f	g	

Deep Beam Type

Post Material		Post Size		Post Spacing
Steel	Wood	w	d	Ctr to Ctr

w = width d = depth

Other - Describe

Legend
t_{deck} = Deck Thickness
$t_{o'lay}$ = Overlay Thickness
w = Cap Width
h = Cap Height
E_1 = Left Edge Dist
E_2 = Right Edge Dist

Girder Type

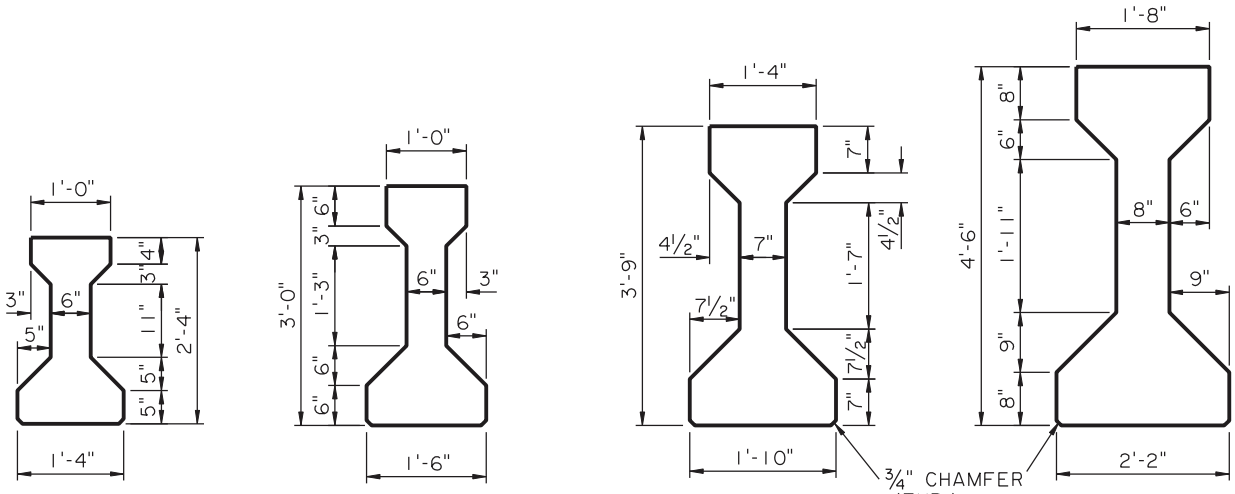
Steel:
- ☐ Steel Plate
- ☐ Wide Flange, WF, Size = _____
- ☐ Continuous Plate

** Concrete:
- ☐ Type II
- ☐ Type III
- ☐ Type III
- ☐ Type _____
- ☐ Quad Beam
- ☐ Other, Describe _____

Typical Steel Girder Section

** See Attached Standard Dimensional Properties to make selection

Provide Any Additional Applicable Information



BEAM PROPERTIES

BEAM TYPE	AREA ($in.^2$)	"x" * (in.)	$\bar{Y}$ (in.)	MOMENT OF INERTIA ($in.^4$)	WEIGHT ❶ (lbs./ft.)	BOTTOM SECT. MOD. ($in.^3$)	TOP SECT. MOD. ($in.^3$)
I	276	12.5	12.59	22,750	288	1,805	1,307
II	369	16.5	15.83	50,980	384	3,220	2,527
III	559	21.0	20.27	125,390	583	6,186	5,070
IV	789	25.5	24.73	260,730	822	10,543	8,908

❶ BASES ON CONCRETE DENSITY OF 150 LBS./FT.^{3}

* THIS DIMENSION MAY BE ADJUSTED TO CLEAR DRAPED STRANDS WHEN NECESSARY. THIS DIMENSION IS TYPICALLY FOR ALL GIRDERS REGARDLESS OF ROADWAY CROWN.

⊗ INTERIOR GIRDERS ONLY.

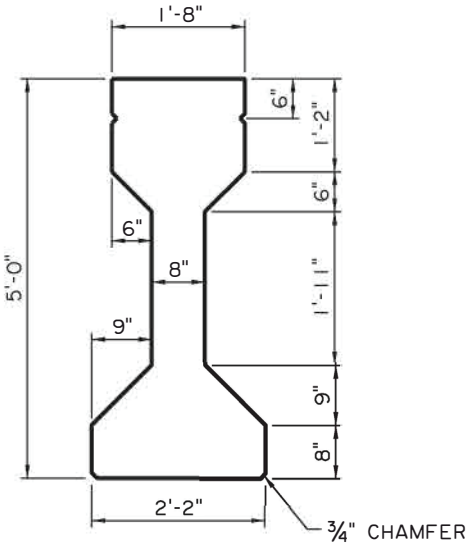
⊕ NO DEDUCTION MADE FOR ¾" CHAMFERS AT GIRDER BASE.

DIMENSIONS AND PROPERTIES

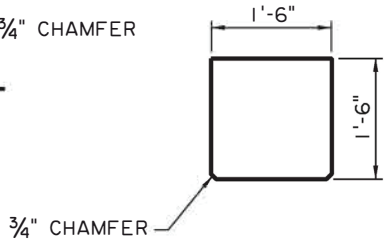
PRESTRESSED GIRDERS

1 OF 2

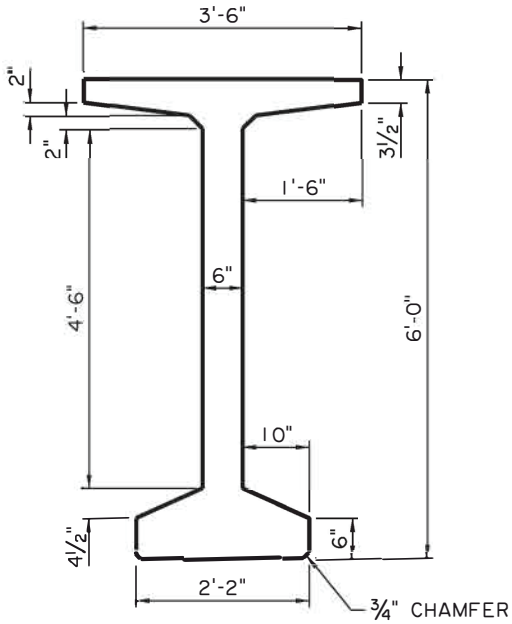
SCALE: ½" = 1'



TYPE IV-MODIFIED

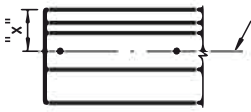


QUADBEAM

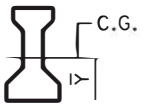


TYPE BT

BEAM PROPERTIES



℄ 2" DIA. OPEN HOLE AT ℄ END AND INTERMEDIATE DIAPHRAGMS ⊗



BEAM TYPE	AREA ($in.^2$)	"x" * (in.)	$\bar{Y}$ (in.)	MOMENT OF INERTIA ($in.^4$)	WEIGHT ❸ (lbs./ft.)	BOTTOM SECT. MOD. ($in.^3$)	TOP SECT. MOD. ($in.^3$)
IV-MOD	909	31.5	28.99	369,320	947	12,740	11,910
BT	766	34.5	36.63	545,113	798	14,881	15,412
QUAD	323	9.0	9.02	8,705	337	966	969

❸ BASES ON CONCRETE DENSITY OF 150 LBS./$FT.^3$

* THIS DIMENSION MAY BE ADJUSTED TO CLEAR DRAPED STRANDS WHEN NECESSARY. THIS DIMENSION IS TYPICALLY FOR ALL GIRDERS REGARDLESS OF ROADWAY CROWN.

⊗ INTERIOR GIRDERS ONLY.

DIMENSIONS AND PROPERTIES

PRESTRESSED GIRDERS

2 OF 2

SCALE: ½" = 1'

A-16: EXAMPLE CEO LETTER

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

INTRADEPARTMENTAL CORRESPONDENCE

REFERRED TO

_____
_____
_____

_____ REFERRED FOR ACTION
_____ ANSWER FOR MY SIGNATURE
_____ FOR FILE
_____ FOR YOUR INFORMATION
_____ FOR SIGNATURE
_____ RETURN TO ME
_____ PLEASE SEE ME
_____ PLEASE TELEPHONE ME
_____ FOR APPROVAL
_____ PLEASE ADVISE ME
_____ _____

BY _____ DATE _____
BY _____ DATE _____
BY _____ DATE _____

MEMORANDUM

TO: **CHRISTOPHER P. KNOTTS, P.E.**
DOTD CHIEF ENGINEER

FROM: **DANA FENG, Ph.D., P.E.**
ASSISTANT BRIDGE DESIGN ENGINEER ADMINISTRATOR

DATE: **September 10, 2019**

SUBJECT: **BRIDGE POSTING REQUIREMENTS**

CEO #: WL-048/19

The following bridge structures have been evaluated for load carrying capacity in accordance with the National Bridge Inspection Standards and found inadequate to carry the maximum legal truck weights allowed by Louisiana Law. The following weight limits posting are recommended in accordance with E.D.S.M. No. I.1.1.8. Bridge Design Section has informed the respective District Administrators, Assistant District Administrators-Operation, District Bridge Engineers, Assistant Secretary of Operation, Bridge Maintenance Administrator, Bridge Design Administrator, and Highway Bridge Program Manager in regarding to the required posting and received no objection.

Structure No.	Recall No.	Route	Existing Limit (tons)	Name	Req. Limit (tons)
04600010409571	018920	US0080	-----	MILE CREEK	10-15

By copy of this memorandum, District Administrator(s) shall instruct his/her work force to install or replace the weight limit signs immediately at the subject bridge site. Any existing Assistant Secretary's/Chief Engineer's Orders for subject bridges are hereby rescinded.

cc:

Ms. ZhengZheng Fu
Mr. Nick Fagerburg
Mr. Paul Vaught
Mr. Vincent Latino
Ms. Tammy Anderson
All District Administrators
All Assistant District Administrators-Operation
All District Bridge Engineers

_____ _____
RECOMMENDED FOR APPROVAL DATE

_____ _____
RECOMMENDED FOR APPROVAL DATE

AN EQUAL OPPORTUNITY EMPLOYER
A DRUG FREE WORKPLACE

_____ 9/10/19
APPROVED DATE

A-17: MOVABLE BRIDGE ELEMENTS

MOVEABLE BRIDGE ELEMENTS (ADEs)

El. No.	Element Name	Description	Units
840	Open Gearing	Defines all gears that are not enclosed in an oil tight, dust tight housing. Includes the rack or rack pinion. (Each gear and pinion set count as one unit)	Each
841	Speed Reducers	Defines gear sets that are mounted with shafts and bearings in dust proof, oil tight housing.	Each
842	Shafts	Defines the shafts that serve to transmit torque from one part to another.	Each
843	Shaft Bearings and Shaft Couplings	Defines the members that support the shafts or joins shafts together.	Each
844	Brakes	Defines the members including limit switches that are used to stop the span and hold the span in the open/closed positions.	Each
845	Emergency Drive and Back-Up Power Systems	Defines those members that function as a back-up drive and power system in case of failure of the main drive and/or power system.	Each
847	Hydraulic Power Units	Defines the pump, electric motor, valves, filters, oil reservoir, and accessories that make up the Hydraulic Power Unit. Any limit switches which assist in controlling the units are incidental to this item.	Each
848	Hydraulic Piping System	Defines the pipe, tubing, and flexible hose including fittings, manifolds, and piping supports which conduct fluids for a fluid power system.	Each
849	Hydraulic Cylinders/Motors/Rotary Actuators	Defines those components which convert fluid pressure into mechanical force and motion. Any limit switches that assist in controlling this element are incidental to this item.	Each
850	Machinery Base	Defines the independent frame/support that holds the machinery.	Each
860	Span Locks/Toe Locks/Heel Stops/Tail Locks	Defines all locks and motors used to drive the locks present on the structure. Limit switches which control the movement of the locks are incidental to this item.	Each
861	Live Load Shoes/Wedges/Strike Plates/Buffer Cylinders	Defines those elements used to transmit live load from the moveable span to the substructure, or to cushion the span while it is being closed.	Each
862	Counterweight Support	Defines the structural steel elements used to support the counterweight and attachments.	Each
863	Counterweight	Defines the counterweight and includes any balance blocks.	Each
864	Access Ladder and Platforms	Defines the members that make up the access ladder and platforms. Each access ladder and platform is counted as one item.	Each
865	Trunnion-Straight/Curved Rack	Defines the trunnions about which the leaf of a bascule bridge rotates, the curved rack mounted on the leaf, and straight rack mounted on the pier for a rolling bascule. Trunnion journals and bearings are incidental to this item.	Each
870	Transformers and Thyristors	Defines the members that step down the voltage of the incoming power to a level compatible with the bridge equipment.	Each
871	Submarine Cable	Defines the cable that is used to carry power and control signals from one pier to the other pier on a bridge.	Each
872	Conduit and Junction Boxes	Defines those members which enclose, support, and protect the power and control wiring. The quantity for this element will only be "1" for the entire bridge.	Each
873	Programmable Logic Controllers	Defines the general-purpose industrial microprocessor-based control systems.	Each
874	Control Console	Defines the console which controls the operation of the moveable bridge. This element includes interlocks, span limit switches, and span position indicator devices.	Each
880	Cables - Vertical Lift	Defines only those steel cables on a vertical lift bridge.	Each
881	Bridge Specific Equipment (Lift)	Defines those components found on Lift Bridges but not found on other types of moveable bridges such as sheaves, span guides, counterbalance chains, etc. The quantity for this element will be one (1) for each item.	Each
882	Bridge Specific Equipment (Swing)	Defines those components found on Swing Bridges but not found on other types of moveable bridges such as balance wheels, tracks, etc. The quantity for this element will be one (1) for each item.	Each
883	Bridge Specific Equipment (Pontoon)	Defines those components found on Pontoon Bridges but not found on other types of moveable bridges such as Pontoons, sheaves, open/close cables, winches, etc. The quantity for this element will be one (1) for each item.	Each
884	Bridge Specific Equipment (Bascule)	Defines those components found on Bascule Bridges but not found on other types of moveable bridges such as Trunnions, etc. The quantity for this element will be one (1) for each item.	Each
885	Barriers - Moveable Bridges	Defines the components that provides a physical barrier to vehicles while the bridge is in the open position and all equipment required to operate the barrier. All limit switches required to operate the barrier are incidental to this item.	Each
886	Traffic Warning Gates - Moveable Bridges	Defines the components that alert vehicular traffic to impending bridge operation. This element includes all equipment required to operate the traffic gate. Limit switches that control the operation of the traffic gate are incidental to this item.	Each
890	Traffic Signals	Defines the components that signals vehicular traffic when to stop and start.	Each
891	Navigational Light System	Defines the lights for navigation mounted on the bridge or fender system. This is not limited to lights on moveable bridges. This element includes clearance gauge lights and power system. Inspection should include the back-up power system.	Each
892	Fender System/Pier Protection	Defines those wood, steel, or concrete fender systems and/or pier protection systems in or around the bridge elements.	Each

MOVEABLE BRIDGE ELEMENT GUIDE

840 Open Gearing

Element Number	Description	Unit
840	This element defines all gears that are not enclosed in an oil tight, dust tight housing. This element includes the rack or rack pinion. (Each gear and pinion set count as one unit.)	Each

Condition	Description	Feasible Action
1	Gears are properly aligned and lubricated; minimal wear or corrosion is present.	0 - Do Nothing
2	Minor misalignment, gear teeth pitting, wear, or corrosion is measurable, but operation of drive system not impacted.	0 - Do Nothing 1 - Realign
3	Major misalignment, gear teeth pitting, wear, or corrosion is extensive, operation of drive system may be affected. There may be minor cracking in the casting requiring structural review.	0 - Do Nothing 1 - Realign 2 - Replace Member
4	Major misalignment, gear teeth fractures may be present, operation of drive system threatened.	0 - Do Nothing 1 - Realign 2 - Replace Member

841 Speed Reducers

Element Number	Description	Unit
841	This element defines gear sets that are mounted with shafts and bearings in dust proof, oil tight housings.	Each

Condition	Description	Feasible Action
1	Gears are properly operating, and lubricant level is okay.	0 - Do Nothing
2	Minor backlash or teeth wear has caused minimum noise in the gears. Case cracks have occurred above oil level. Oil has been contaminated.	0 - Do Nothing 1 - Repair Cracks 2 - Replace Member 3 - Replace Oil 4 - Adjust Span Setup (Speed or Balance)
3	Moderate backlash or teeth wear has caused moderate noise in the gears. Case cracks have occurred at or above oil level. Oil has been contaminated.	0 - Do Nothing 1 - Repair Cracks 2 - Replace Member 3 - Replace Oil 4 - Adjust Span Setup (Speed or Balance)
4	Major backlash or teeth wear has caused major noise in the gears. Case cracks occurred below oil level.	0 - Do Nothing 1 - Repair Cracks 2 - Replace Member 3 - Adjust Span Setup (Speed or Balance)

842 Shafts

Element Number	Description	Unit
842	This element defines the shafts that serve to transmit torque from one part to another.	Each

Condition	Description	Feasible Action
1	Shafts/couplings are properly aligned, bearings are properly lubricated, shaft clearance at bearings is appropriate, and no cracks or corrosion are present.	0 - Do Nothing
2	Shafts are not properly aligned, bearings are not lubricated, or shaft clearance at bearings is not uniform. Minor corrosion may be present. Seals and gaskets show evidence of minor leaking.	0 - Do Nothing 1 - Lubricate Bearing
3	Measurable section loss is present. Minor cracks are evident in shaft or bearing supports. Seals and gaskets are not working. Shafts/couplings are not properly aligned.	0 - Do Nothing 1 - Lubricate Bearing 2 - Replace Seals & Gaskets 3 - Align Shafts
4	Significant section loss or major cracking threaten operation of bridge. Shafts/couplings are not properly aligned.	0 - Do Nothing 1 - Replace Member

843 Shaft Bearings and Shaft Couplings

Element Number	Description	Unit
843	This element defines the members that support the shafts or join shafts together.	Each

Condition	Description	Feasible Action
1	Couplings are properly aligned; bearings are properly lubricated; shaft clearance at bearings is appropriate, and no cracks or corrosion are present.	0 - Do Nothing
2	Couplings are not properly aligned, bearings are not lubricated; and shaft clearance at bearings is not uniform. Minor corrosion may be present. Seals and gaskets show evidence of minor leaking.	0 - Do Nothing 1 - Lubricate Bearing
3	Measurable section loss is present. Minor cracks are evident in shaft or bearing supports. Seals and gaskets are not working. Minor slack is evident in coupling.	0 - Do Nothing 1 - Lubricate Bearing 2 - Replace Seals & Gaskets 3 - Align Shafts
4	Significant section loss or major cracking threaten operation of bridge. Major slack is evident in coupling	0 - Do Nothing 1 - Replace Member

844 Brakes

Element Number	Description	Unit
844	This element defines the members including limit switches that are used to stop the span and hold the span in the open/closed positions.	Each

Condition	Description	Feasible Action
1	Clearances are normal, shoes do not show abnormal wear; shoes are clean; no oil or grease is present on shoes; and shoes do not have a glazed appearance. Brake wheel surface is clean and smooth. Brakes operate correctly. Moving parts are properly lubricated.	0 - Do Nothing
2	Brakes are operating properly; moving parts may need lubricating; oil may need to be changed, and minor corrosion or shoe wear may be evident.	0 - Do Nothing 1 - Lubricate and Fill Hydraulic Fluid
3	Brake operation needs improvement; measurable corrosion may be present; and moving parts may be sticking. Excessive shoe wear is evident.	0 - Do Nothing 1 - Lubricate and Fill Hydraulic Fluid 2 - Replace Shoes
4	Brakes are not functioning and require replacement.	0 - Do Nothing 1 - Replace Shoes 2 - Replace Member

845 Emergency Drive and Back Up Power System

Element Number	Description	Unit
845	This element defines those members that function as a back-up drive and power system in case of failure of the main drive and/or power system.	Each

Condition	Description	Feasible Action
1	System is operating properly.	0 - Do Nothing
2	System needs servicing.	0 - Do Nothing 1 - Service Member
3	System needs repair.	0 - Do Nothing 1 - Repair Member
4	System needs replacement.	0 - Do Nothing 1 - Replace Member

847 Hydraulic Power Units

Element Number	Description	Unit
847	This element defines the pump, electric motor, valves, filters, oil reservoir and accessories that make up the Hydraulic Power Unit. Any limit switches, which assist in controlling the Hydraulic Power Units, are incidental to this element.	Each

Condition	Description	Feasible Action
1	All components are clean, no leakage is present, and there is no build-up of dirt and debris. Fluid level in the reservoir is within the prescribed limits. Fluid conductors are free of abrasion, flattening or kinking. Gauge readings are within prescribed limits. Filters are clean. Hydraulic Power Unit is operating properly.	0 - Do Nothing
2	Hydraulic Power Unit is operating properly, but there is need for maintenance or servicing. There may be minor leakage of hydraulic fluid.	0 - Do Nothing 1 - Replace Fluids 2 - Repair Member
3	Hydraulic Power Unit is not operating properly; there is evidence that repairs may be needed. There may be moderate leakage of hydraulic fluid.	0 - Do Nothing 1 - Replace Fluids 2 - Repair Member
4	Hydraulic Power Unit is not operating or is operating poorly. Replacement of all or part of the Hydraulic Power Unit may be required.	0 - Do Nothing 1 - Replace Fluids 2 - Repair Member

848 Hydraulic Piping System

Element Number	Description	Unit
848	This element defines the pipe, tubing, and flexible hose including fittings, manifolds and piping supports, which conduct fluids for a fluid power system.	Each

Condition	Description	Feasible Action
1	Piping system is clean and shows no sign of leakage. Flexible hose is properly installed and aligned. Pipe, tubing and hoses are free of damage, corrosion, and abrasion.	0 - Do Nothing
2	Minor deterioration or corrosion present. There may be minor leakage of hydraulic fluid present. Maintenance may be required.	0 - Do Nothing 1 - Repair Member, Refill Fluids
3	Moderate deterioration or corrosion present. There may be minor to moderate leakage of hydraulic fluid present. Maintenance is required.	0 - Do Nothing 1 - Repair Member, Refill Fluids
4	There is significant leakage present. Repair or replacement required.	0 - Do Nothing 1 - Repair Member, Refill Fluids 2 - Replace Member

849 Hydraulic Cylinders/Motors/Rotary Actuators

Element Number	Description	Unit
849	This element defines those components, which convert fluid pressure into mechanical force and motion. Any limit switches that assist in controlling this element are incidental to this element.	Each

Condition	Description	Feasible Action
1	Units are clean and no signs of excess leakage are present. Cylinder rods are not scored. Cylinder rod boots are connected and not damaged. Cylinder rods operate smoothly and freely. Bushings are not worn and are lubricated.	0 - Do Nothing
2	Units are operating properly, but there is need for maintenance or servicing. There may be minor leakage of hydraulic fluid. Unit anchors are loosening or wearing. Cylinder rod boots loose or damaged.	0 - Do Nothing 1 - Repair Member, Refill Fluids 2 - Service Member
3	Units are not operating properly; there is evidence that repairs may be needed. There may be moderate leakage of hydraulic fluid. Unit anchors are missing/unattached. Cylinder rod boots missing.	0 - Do Nothing 1 - Repair Member, Refill Fluids 2 - Service Member
4	Units are not operating or are operating poorly. Replacement may be required.	0 - Do Nothing 1 - Repair Member, Refill Fluids 2 - Replace Member

850 Machinery Base

Element Number	Description	Unit
850	This element defines the independent frame/support that holds the machinery.	Each

Condition	Description	Feasible Action
1	There is no evidence of active corrosion, and the paint system is sound and functioning as intended to protect the metal surface. Repairs are sound.	0 - Do Nothing
2	Paint system is showing signs of deterioration. Surface corrosion has or is forming. There may be exposed metal, but there is no active corrosion, which is causing loss of section. Unit anchors are loosening or wearing.	0 - Do Nothing 1 - Clean and Recoat 2 - Reattach Member
3	Corrosion may be present, but any section loss due to active corrosion does not yet warrant structural review. Movement of clevis pins may exceed desirable limits. Limited cracking may be present. Unit anchors are missing or unattached.	0 - Do Nothing 1 - Clean and Recoat 2 - Reattach Member 3 - Replace Member
4	Corrosion has caused section loss and is sufficient to warrant structural review to ascertain the impact on the ultimate strength and/or serviceability of the element. Movement of clevis pins may be excessive. Severe cracking may exist.	0 - Do Nothing 1 - Replace Member

860 Span Locks/Toe Locks/Heel Stops/Tail Locks

Element Number	Description	Unit
860	This element defines all locks and motors used to drive the locks present on the structure. Limit switches, which control the movement of the locks, are incidental to this item.	Each

Condition	Description	Feasible Action
1	Locks are operating properly, there are no signs of deterioration, wear, or distress. Clearances may not be within specifications.	0 - Do Nothing
2	Locks are operating properly; there are signs of limited deterioration or wear and clearances may not be within specifications. Lubrication may be needed. Maintenance may be required.	0 - Do Nothing 1 - Lubricate
3	Locks are not operating properly, there are signs of significant deterioration or wear, and clearances may not be within specifications. Repair may be required.	0 - Do Nothing 1 - Lubricate 2 - Reset Locks and Catches
4	Locks are not operating or are operating poorly. There is excessive deterioration or wear. Replacement may be required.	0 - Do Nothing 1 - Reset Locks and Catches 2 - Replace Member

861 Live Load Shoes/Wedges/Strike Plates/Buffer Cylinders

Element Number	Description	Unit
861	This item defines those elements used to transmit live load from the movable span to the substructure, or to cushion the span while it is being closed.	Each

Condition	Description	Feasible Action
1	This element shows little or no deterioration. If a paint system is present, it is sound and functioning as intended to protect the metal. There is minimal corrosion. Vertical and horizontal alignments are within limits. Buffer is operating effectively.	0 - Do Nothing
2	The paint system, if present, may show minor to moderate corrosion with minimal pitting but still functioning as intended. The strike plate may have moved enough to cause minor cracking in the supporting concrete. Alignment of the live load shoe and strike plate is still within limits. Buffer may have lost some of its effectiveness. Shim plates may be loose.	0 - Do Nothing 1 - Clean and Coat
3	The paint system, if present, may show moderate to heavy corrosion with some pitting but still functioning as intended. The strike plate may have moved enough to cause moderate cracking in the supporting concrete. Alignment of the live load shoe and strike plate is still tolerable. There may be no contact with the live load shoe. Buffer has lost most of its effectiveness. Shim plates are loose or missing. Oiler may be empty, and buffer rod is beginning to corrode.	0 - Do Nothing 1 - Clean and Coat 2 - Lubricate
4	Advanced corrosion with section loss. There may be loss of section of the supporting member sufficient to warrant supplemental supports or load restrictions. Misalignment has occurred. Oiler may be empty, and buffer rod is frozen. Bridge is not seated fully or is seating too hard.	0 - Do Nothing 1 - Clean and Coat 2 - Realign Span 3 - Replace Member

862 Counterweight Support

Element Number	Description	Unit
862	This element defines the structural steel elements used to support the counterweight and attachments.	Each

Condition	Description	Feasible Action
1	There is no evidence of active corrosion, and the paint system is sound and functioning as intended to protect the metal surface.	0 - Do Nothing
2	There is little or no active corrosion. Surface corrosion has formed or is forming. The paint system may be chalking, peeling, curling or showing other early evidence of paint system distress, but there is no exposure of metal.	0 - Do Nothing 1 - Clean and Coat
3	Surface corrosion is prevalent. There may be exposed metal with active corrosion but any section loss due to corrosion does not yet warrant structural review.	0 - Do Nothing 1 - Clean and Coat 2 - Rehab Member
4	Corrosion has caused section loss and is sufficient to warrant structural review to ascertain the impact on the ultimate strength and/or serviceability of the element.	0 - Do Nothing 1 - Rehab Member 2 - Replace Member

863 Counterweight

Element Number	Description	Unit
863	This element defines the counterweight, and includes any balance blocks.	Each

Condition	Description	Feasible Action
1	The element shows little or no deterioration. There may be discoloration, efflorescence, and/or superficial cracking, but without effect on strength and/or serviceability.	0 - Do Nothing
2	Minor cracks and spalls may be present, but there is no exposed reinforcing or surface evidence or rebar corrosion.	0 - Do Nothing 1 - Clean Rebar; Patch/Seal
3	Some delaminations and/or spalls may be present and some reinforcing may be exposed. Corrosion of rebar may be present, but loss of section is incidental and does not significantly affect the strength and/or serviceability of either the element or the bridge.	0 - Do Nothing 1 - Clean Rebar; Patch/Seal 2 - Rehab Member
4	Deterioration is advanced. Corrosion of reinforcement and/or loss of concrete section is sufficient to warrant review to ascertain the effect on the strength and/or serviceability of either the element or the bridge.	0 - Do Nothing 1 - Clean Rebar; Patch/Seal 2 - Rehab Member 3 - Replace Member

864 Access Ladder and Platforms

Element Number	Description	Unit
864	This element defines the members that make up the access ladder and platforms. Each access ladder and platform is counted as one item.	Each

Condition	Description	Feasible Action
1	There is no evidence of active corrosion, and the paint system is sound and functioning as intended to protect the metal surface.	0 - Do Nothing
2	There is little or no active corrosion. Surface corrosion has formed or is forming. The paint system may be chalking, peeling, curling, or showing other early evidence of paint system distress, but there is no exposure of metal.	0 - Do Nothing 1 - Clean and Coat
3	Surface corrosion is prevalent. There may be exposed metal, but there is no active corrosion, which is causing loss of section.	0 - Do Nothing 1 - Clean and Coat 2 - Rehab Member
4	Corrosion has caused section loss and is sufficient to warrant structural review to ascertain the effect on the ultimate strength and/or serviceability of the element. Attachment anchors may be loose, cracked, or missing.	0 - Do Nothing 1 - Rehab Member 2 - Replace Member

865 Trunnion-Straight/Curved Rack

Element Number	Description	Unit
865	This element defines the trunnions about which the leaf of a bascule bridge rotates, the curved rack mounted on the leaf and straight rack mounted on the pier for a rolling bascule. Trunnion journals and bearings are incidental.	Each

Condition	Description	Feasible Action
1	Minimal wear or corrosion is present, alignment and lubrication is good.	0 - Do Nothing
2	Minor misalignment has occurred; lubrication may be needed; teeth wear or corrosion is measurable, but operation is not affected.	0 - Do Nothing 1 - Lubricate
3	Major misalignment has occurred; wear or corrosion is extensive; operation of drive system may be affected.	0 - Do Nothing 1 - Lubricate 2 - Realign
4	Major misalignment has occurred; teeth fractures may be present; operation of drive system is threatened.	0 - Do Nothing 1 - Lubricate 2 - Realign 3 - Replace Member

870 Transformers and Thyristors

Element Number	Description	Unit
870	This element defines the members that step down the voltage of the incoming power to a level compatible with the bridge equipment.	Each

Condition	Description	Feasible Action
1	There are no signs of corrosion, oil leakage or any deteriorated condition at the transformer. There are no blown fuses at the transformer.	0 - Do Nothing
2	There are minor signs of corrosion and/or oil leakage.	0 - Do Nothing 1 - Clean and Coat
3	There are moderate signs of corrosion and/or oil leakage.	0 - Do Nothing 1 - Clean and Coat 2 - Rehab Member
4	There are major signs of corrosion and/or oil leakage. A fuse at the transformer may be blown.	0 - Do Nothing 1 - Rehab Member 2 - Replace Member

871 Submarine Cable

Element Number	Description	Unit
871	This element defines the cable that is used to carry power and control signals from one pier to the other pier on a bridge.	Each

Condition	Description	Feasible Action
1	The cable is firmly attached to the pier wall and protected. There is no chafing of the outer protective coating. Cable is properly grounded.	0 - Do Nothing
2	The cable has some loose attachments to the pier wall. There is chafing of the outer protective coating.	0 - Do Nothing 1 - Replace Member
3	The cable is not firmly attached to the pier wall. There is moderate deterioration of the outer protective coating. Cable is not properly grounded.	0 - Do Nothing 1 - Replace Member
4	There is significant deterioration to the outer protective coating, or the cable is not functioning properly. Minimal spare wires are available; cable may need replacing.	0 - Do Nothing 1 - Replace Member

872 Conduit and Junction Boxes

Element Number	Description	Unit
872	This element defines those members, which enclose, support and protect the power and control wiring. The quantity for this element will only be one (1) for the entire bridge.	Each

Condition	Description	Feasible Action
1	There is no evidence of corrosion; supports are tight and firmly anchored into concrete or attached to structural steel. Junction box cover gaskets are intact and provide a good seal. Less connections and terminal strips are not tight. Between 2% and 10% of the conduit is in poor condition.	0 - Do Nothing
2	There is major corrosion, supports are broken or missing; junction box is badly deteriorated, and conduit may be broken. Connections and terminal strips are not tight. Between 2% and 10% of the conduit is in poor condition.	0 - Do Nothing 1 - Repair Member 2 - Replace Member
3	There is major corrosion, supports are broken or missing; junction box is badly deteriorated, and conduit may be broken. Between 10% and 25% of the conduit is in poor condition.	0 - Do Nothing 1 - Repair Member 2 - Replace Member
4	There is major corrosion, supports are broken or missing, junction box badly deteriorated, and conduit may be broken. 25% or more of the conduit is in poor condition.	0 - Do Nothing 1 - Rehab Member 2 - Replace Member

873 Programmable Logic Controllers

Element Number	Description	Unit
873	This element defines the general-purpose industrial microprocessor-based control systems.	Each

Condition	Description	Feasible Action
1	Diagnostic display or bridge tender reports do not indicate equipment malfunction; air filters are clean; and there is no accumulation of dirt and dust. Wiring connections are all tight. Controlled item is operating properly through entire range of movement and smoothly ramps and seats.	0 - Do Nothing
2	Air filters are not clean, there is accumulation of dirt and dust, lights on controller may not work.	0 - Do Nothing 1 - Clean Member; Replace Filters
3	Air filters missing, large accumilation of dirt and dust, lights on controller are not working. Wiring connections are not tight. Controlled item may not be operating properly through entire range of movement or may not ramp or seat properly.	0 - Do Nothing 1 - Clean Member; Replace Filters; Tighten Connections
4	The diagnostic display or bridge tender indicate malfunctions, the programmable logic controller is not working. Controlled item may be slamming/not moving.	0 - Do Nothing 1 - Repair Member

874 Control Console

Element Number	Description	Unit
874	This element defines the console, which controls the operation of the movable bridge. This element includes interlocks, span limit switches and span position indicator devices.	Each

Condition	Description	Feasible Action
1	There is no corrosion or paint failure, the console area is clear of foreign objects, all switches operate properly, all bypass switches are locked or sealed to prevent inadvertent operation, there are no burned out pilot light lamp or missing or broken lamp lenses.	0 - Do Nothing
2	There is some corrosion or paint failure, the console is not clear of foreign objects. Loose/entangled wires or improperly labeled/tagged wires.	0 - Do Nothing 1 - Clean and Paint
3	There is heavy corrosion or paint failure, there are burned out pilot light lamps, missing or broken lamp lenses. Missing electrical covers, broken breakers. Some bypasses are on with remaining bypass switches locked and sealed.	0 - Do Nothing 1 - Clean and Paint 2 - Repair Member
4	The switches/breakers do not operate properly, the bypass switches are not locked or sealed.	0 - Do Nothing 1 - Repair Member 2 - Replace Member

880 Cables - Vertical Lift

Element Number	Description	Unit
880	This element defines only those steel cables on a vertical lift bridge.	Each

Condition	Description	Feasible Action
1	Little or no corrosion. No signs of distress in strand or anchor sockets.	0 - Do Nothing
2	Surface or freckled rust has formed or is forming. No signs of distress in strand or anchor sockets.	0 - Do Nothing 1 - Clean and Lubricate
3	Corrosion may be present, but any section loss is incidental and does not affect the strength or serviceability of element or bridge. Cable strands may be worn. Cable banding/clamps, if any, may show some loosening or slipping. Cable anchor devices may be loosening.	0 - Do Nothing 1 - Clean and Lubricate
4	Corrosion is advanced. Cable strands may be broken or severely abraded. Anchors show signs of slippage. Section loss or other deterioration is sufficient to warrant analysis to determine impact member strength and/or serviceability of both element and bridge.	0 - Do Nothing 1 - Rehab Member; Lubricate 2 - Replace Member

881 Bridge Specific Equipment (Lift)

Element Number	Description	Unit
881	This element defines those components found on Lift Bridges, but not found on other types of movable bridges such as sheaves, span guides, counterbalance chains, etc. The quantity for this element will be one (1) for each item.	Each

Condition	Description	Feasible Action
1	There is no need for any maintenance or repair.	0 - Do Nothing
2	There is need for maintenance.	0 - Do Nothing 1 - Service Member
3	There is need for repair.	0 - Do Nothing 1 - Repair Member
4	There is need for replacement or rehabilitation.	0 - Do Nothing 1 - Repair Member 2 - Replace Member

882 Bridge Specific Equipment (Swing)

Element Number	Description	Unit
882	This element defines those components found on Swing Bridges, but not found on other types of movable bridges such as balance wheels and tracks. The quantity for this element will be one (1) for each item.	Each

Condition	Description	Feasible Action
1	There is no need for any maintenance or repair.	0 - Do Nothing
2	There is need for maintenance.	0 - Do Nothing 1 - Service Member
3	There is need for repair.	0 - Do Nothing 1 - Repair Member
4	There is need for replacement or rehabilitation.	0 - Do Nothing 1 - Repair Member 2 - Replace Member

883 Bridge Specific Equipment (Pontoon)

Element Number	Description	Unit
883	This element defines those components found on Pontoon Bridges, but not found on other types of movable bridges such as Pontoons, sheaves, open/close cables, winches, etc. The quantity for this element will be one (1) for each item.	Each

Condition	Description	Feasible Action
1	There is no need for any maintenance or repair.	0 - Do Nothing
2	There is need for maintenance.	0 - Do Nothing 1 - Service Member
3	There is need for repair.	0 - Do Nothing 1 - Repair Member
4	There is need for replacement or rehabilitation.	0 - Do Nothing 1 - Repair Member 2 - Replace Member

884 Bridge Specific Equipment (Bascule)

Element Number	Description	Unit
884	This element defines those components found on Bascule Bridges, but not found on other types of movable bridges such as Trunnions, etc. The quantity for this element will be one (1) for each item.	Each

Condition	Description	Feasible Action
1	There is no need for any maintenance or repair.	0 - Do Nothing
2	There is need for maintenance.	0 - Do Nothing 1 - Service Member
3	There is need for repair.	0 - Do Nothing 1 - Repair Member
4	There is need for replacement or rehabilitation.	0 - Do Nothing 1 - Repair Member 2 - Replace Member

885 Barriers - Moveable Bridges

Element Number	Description	Unit
885	This element defines the component that provides a physical barrier to vehicles, while the bridge is in the open position and all equipment required to operate the barrier. All limit switches required to operate the barrier are incidental to this element.	Each

Condition	Description	Feasible Action
1	There is no need for any maintenance or repair.	0 - Do Nothing
2	There is need for maintenance.	0 - Do Nothing 1 - Service Member
3	There is need for repair.	0 - Do Nothing 1 - Repair Member
4	There is need for replacement or rehabilitation.	0 - Do Nothing 1 - Repair Member 2 - Replace Member

886 Traffice Warning Gates - Moveable Bridges

Element Number	Description	Unit
886	This element defines the components that alert vehicular traffic to impending bridge operation. This element includes all equipment required to operate the traffic gate. Limit switches that control the operation of the traffic gate, if present, are incidental to this item.	Each

Condition	Description	Feasible Action
1	There is no need for any maintenance or repair.	0 - Do Nothing
2	There is need for maintenance.	0 - Do Nothing 1 - Service Member
3	There is need for repair.	0 - Do Nothing 1 - Repair Member
4	There is need for replacement or rehabilitation.	0 - Do Nothing 1 - Repair Member 2 - Replace Member

890 Traffic Signals

Element Number	Description	Unit
890	This element defines the component that signals vehicular traffic when to stop and start.	Each

Condition	Description	Feasible Action
1	There is no need for any maintenance or repair.	0 - Do Nothing
2	There is need for maintenance.	0 - Do Nothing 1 - Service Member
3	There is need for repair.	0 - Do Nothing 1 - Repair Member
4	There is need for replacement or rehabilitation.	0 - Do Nothing 1 - Repair Member 2 - Replace Member

891 Navigational Light System

Element Number	Description	Unit
891	This element defines the lights for navigation, mounted on the bridge or fender system and is not limited to lights on movable bridges. This element includes clearance gauge lights and power system. Inspection should include the back-up power system.	Each

Condition	Description	Feasible Action
1	Lights are operational, lenses are clean and not broken, and there is no evidence of corrosion.	0 - Do Nothing
2	There is some evidence of corrosion and some lights may be burned out.	0 - Do Nothing 1 - Replace Bulbs
3	There is evidence of corrosion, several lights may be burned out, some lens and/or fixtures may be damaged or broken.	0 - Do Nothing 1 - Replace Bulbs 2 - Repair Member
4	Lights are not operational.	0 - Do Nothing 1 - Replace Bulbs 2 - Repair Member 3 - Replace Member

892 Fender System/Pier Protection

Element Number	Description	Unit
848	This element defines those wood, steel, or concrete fender systems and/or pier protection systems in or around the bridge elements.	Each

Condition	Description	Feasible Action
1	Fender/pier protection system in place and fully functional.	0 - Do Nothing
2	There is minor damage or deterioration to fender/pier protection system.	0 - Do Nothing 1 - Rehab Member
3	There is moderate damage or deterioration to fender/pier protection system.	0 - Do Nothing 1 - Rehab Member
4	There is major damage or deterioration to fender/pier protection system.	0 - Do Nothing 1 - Rehab Member 2 - Replace Member

A-18: 2019 NAVIGATION OPENINGS FOR MOVABLE BRIDGES

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 02

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
JEFFERSON	302	8263900071	BARATARIA - BAYOU BARATARIA	SWING - ELEC.	4	35.7	130	131	208	194	385	384	258						1690	241
LAFOURCHE	316	4120200381	BAYOU BLUE PONTOON - INTRACOASTAL CANAL	PONTOON - ELEC.	4	49.0	104	0	500	789	978	870	295						3536	505
TERREBONNE	56	2470204101	BOUDREAUX - BOUDREAUX CANAL	SWING - HYD.	4	0.3	198	220	330	389	860	981	373						3351	479
TERREBONNE	24	0659001191	BOURG - COMPANY CANAL	V. LIFT - ELEC.	3	8.1	9	26	20	32	18	16	18						139	20
LAFOURCHE	654	8291000001	CHAMPAGNE/ HARRELSON - BAYOU LAFOURCHE	V. LIFT - ELEC.	0	53.2	1	1	1	2	3	3	0						11	2
ORLEANS	US 90	0060500001	CHEF - CHEF MENTEUR	SWING - ELEC.	4	2.8	47	36	19	29	43	46	35						255	36
TERREBONNE	3197	8551800401	COUNTRY CLUB - HOUMA CANAL	SWING - ELEC.	0	1.7	PERMANENTLY OPEN TO MARINE TRAFFIC													
TERREBONNE	57	2460100021	DAIGLEVILLE - BAYOU TERREBONNE	SWING - HYD.	3	35.5	31	24	27	29	40	36	33						220	31
ORLEANS	US 90	0069001301	DANZIGER - INNER HARBOR NAVIGATION CANAL	V. LIFT - ELEC.	4	5.4	8	14	7	19	11	16	11						86	12
ST. CHARLES	631	8450600001	DES ALLEMANDS - BAYOU DES ALLEMANDS	SWING - ELEC.	3	13.9	2	3	1	5	6	3	0						20	3
TERREBONNE	57	2460117211	DULAC - BAYOU DULAC	SWING - HYD.	4	0.5	61	52	157	174	448	753	125						1770	253
TERREBONNE	315	2459009801	DULARGE - INTRACOASTAL CANAL	SEMI-HI-LEVEL DBL. BASC. - ELEC.	4	59.9	442	365	393	464	623	566	470						3323	475
TERREBONNE	315	2450207341	THERIOT - FALGOUT CANAL	SWING - HYD.	4	3.1	235	225	330	337	405	384	438						2354	336
LAFOURCHE	SPUR 308	4070112131	GALLIANO - BAYOU LAFOURCHE	V. LIFT - ELEC.	4	30.6	166	147	176	197	236	235	208						1365	195
TERREBONNE	US 90	0050400001	GIBSON - BAYOU BLACK	V. LIFT - ELEC.	0	7.0	NEED NOT OPEN TO MARINE TRAFFIC PER 33 CFR 117													
LAFOURCHE	308	4070112131	GOLDEN MEADOW - BAYOU LAFOURCHE	V. LIFT - ELEC.	4	23.9	200	170	227	251	398	379	329						1954	279
JEFFERSON	18	0630202351	HARVEY - HARVEY CANAL	DBL. BASC. - HYD.	4	0.2	311	288	377	425	616	560	439						3016	431
TERREBONNE	661	0000085508	HOWARD AVENUE - BAYOU TERREBONNE	V. LIFT - ELEC.	3	0.5	34	34	30	35	30	25	32						220	31
TERREBONNE	55	2480204001	HUMBLE CANAL	SWING - ELEC.	4	0.1	17	9	4	15	63	96	15						219	31

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 02

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
ORLEANS	39	0463102221	JUDGE SEEBER - INNER HARBOR NAVIGATION CANAL	SEMI-HI-LEVEL V. LIFT - ELEC.	4	6.8	123	91	136	154	179	166	152						1001	143
LAFOURCHE	307	8291510171	KRAEMER - BAYOU BOEUF	V. LIFT - ELEC.	3	1.3	36	54	99	132	172	206	130						829	118
TERREBONNE	661	8550800651	LACARPE - BAYOU LACARPE	V. LIFT - ELEC.	0	7.5	0	0	0	0	0	0	0						0	0
ST. BERNARD	46	2840204921	LALOUTRE (YSCLOSKEY) - BAYOU LALOUTRE	V. LIFT - ELEC.	4	2.2	668	620	815	825	1128	989	830						5875	839
LAFOURCHE	657	8291100451	LAROSE - BAYOU LAFOURCHE	V. LIFT - ELEC.	4	38.7	164	142	164	175	185	181	165						1176	168
LAFOURCHE	1	0640503281	LAROSE - INTRACOASTAL CANAL - WEST	SEMI-HI-LEVEL-V. LIFT - ELEC.	4	35.6	772	611	0	0	874	779	761						3797	542
LAFOURCHE	655	8291400791	LOCKPORT - BAYOU LAFOURCHE - OLD	SWING - ELEC.	2	50.8	12	17	15	20	18	17	16						115	16
LAFOURCHE	1	0640601401	LOCKPORT CO. CANAL G.I.W.W.	V. LIFT - ELEC.	2	0.2	16	18	19	18	20	15	18						124	18
TERREBONNE	58	2473001581	MONTEGUT - BAYOU TERREBONNE	V. LIFT - ELEC.	3	22.2	72	71	78	81	113	86	104						605	86
TERREBONNE	661	8550800171	NAVIGATION CANAL - HOUMA NAV. CANAL	SWING - HYD.	4	36.0	497	412	475	542	637	576	549						3688	527
LAFOURCHE	3220	8292700011	NEW LOCKPORT BRIDGE - BAYOU LAFOURCHE	SWING - HYD.	2	49.2	15	44	16	17	23	16	12						143	20
PLAQUEMINES	23	0620200432	PEREZ BRIDGE - ALGIERS CANAL	SEMI-HI-LEVEL V. LIFT - ELEC.	4	3.8	405	331	425	435	473	404	394						2867	410
ORLEANS	US 11	0180200001	PONTCHARTRAIN LAKE - NORTH DRAW	DBL. BASC. - ELEC.	4	--	60	0	0	0	0	0	0						60	9
TERREBONNE	24	659004061	PRESQUE ISLE - BAYOU PETIT CAILLOU	V. LIFT - ELEC.	0	33.7	0	0	0	0	0	0	0						0	0
TERREBONNE	3087	8551400011	PROSPECT BRIDGE - BAYOU TERREBONNE	V. LIFT - ELEC.	2	33.9	15	13	13	15	15	13	15						99	14
LAFOURCHE	US 90	0050700011	RACELAND - BAYOU LAFOURCHE	V. LIFT - ELEC.	0	58.2	2	0	0	1	0	0	0						3	0
LAFOURCHE	649	82918000111	ST. CHARLES - BAYOU LAFOURCHE	SWING - HYD.	0*	66.6	0	0	0	0	0	0	0						0	0
TERREBONNE	58	2473000011	SARAH - BAYOU PETIT CAILLOU	V. LIFT - ELEC.	3	25.7	41	39	35	36	55	39	44						289	41
ORLEANS	1264	28361500851	SEN. TED HICKEY - INNER HARBOR NAVIGATION CANAL	DBL. BASC. - ELEC.	2	4.6	13	43	42	33	33	30	43						237	34

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 02

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
PLAQUEMINES	23		EMPIRE LOCKS				67	58	174	201	485	421	301						1707	244
PLAQUEMINES			OSTRICA LOCKS				31	30	60	40	79	0	28						268	38

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 03

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
ACADIA	91	8010901171	ESTHERWOOD PONTOON BAYOU PLAQ. BRULE	PONTOON - ELEC.	0*	8.0	0	0	0	0	0	0	0						0	0
IBERIA	14	0550700321	DELCAMBRE BAYOU CARLIN	V. LIFT - ELEC.	4	6.4	27	24	13	46	77	88	91						366	52
IBERIA	86	2370100141	NEW IBERIA (DUPERIOR) BAYOU TECHE	DBL. BASC. - ELEC.	0	53.0	4	4	8	3	6	4	6						35	5
IBERIA	83	2400302221	WEEKS PATOUT BAYOU	SWING - HYD.	0	0.4	20	13	18	30	22	14	15						132	19
IBERIA	671	2410100161	JEANERETTE BAYOU TECHE	SWING - ELEC.	0	41.8	7	8	16	9	13	11	7						71	10
IBERIA	86	4003100241	DASPIT BAYOU TECHE	SWING - ELEC.	0	69.0	1	4	9	5	5	4	1						29	4
IBERIA	320	8231200171	OLIVIER BAYOU TECHE	SWING - HYD.	0	48.7	1	1	2	4	5	5	4						22	3
IBERIA	344	8231400251	MORBIHAN BAYOU TECHE	SWING - HYD.	0	56.7	3	3	10	0	0	6	2						24	3
IBERIA	344	8231406331	LOREAUVILLE BAYOU TECHE	V. LIFT - ELEC.	0	62.5	4	5	12	5	9	3	2						40	6
IBERIA	3156	8234200081	JEFFERSON STREET BAYOU TECHE	SWING - HYD.	0	53.3	4	4	14	3	5	4	2						36	5
IBERIA	3182	8234300081	BAYSIDE (JEANERETTE) BAYOU TECHE	SWING - HYD.	0	43.5	1	1	3	0	2	2	5						14	2
IBERIA	3195	8234400101	NELSON CANAL BAYOU TECHE	SWING - HYD.	0	50.4	3	4	9	3	5	4	5						33	5
IBERIA	87	8234604371	NEW IBERIA (LEWIS STREET) BAYOU TECHE	V. LIFT - ELEC.	4	52.5	2	1	38	2	3	3	7						56	8
LAFAYETTE	182	0040103171	PINHOOK VERMILION RIVER	V. LIFT - ELEC.	0*	49.0	0	0	0	0	0	0	0						0	0
LAFAYETTE	92	2130500001	MILTON VERMILION RIVER	V. LIFT - ELEC.	1	37.6	46	27	28	30	39	1	36						207	30
LAFAYETTE	733	8281401231	ELOI BROUSSARD VERMILION RIVER	V. LIFT - ELEC.	0	41.0	26	6	19	0	27	1	2						81	12
LAFAYETTE	3073	82823901521	AMBASSADOR VERMILION RIVER	SWING - HYD.	0	44.9	0	2	3	0	2	0	0						7	1
ST. MARTIN	336	0560400141	BREAUX BRIDGE BAYOU TECHE	V. LIFT - ELEC.		90.5	1	0	0	1	0	0	0						2	0
ST. MARTIN	92	2130804881	KEYSTONE 92 EXT. BRIDGE	SWING - HYD.	0	73.2	0	0	0	0	0	0	0						0	0
ST. MARTIN	96	2380300131	ST. MARTINVILLE BAYOU TECHE	SWING - ELEC.	0	75.2	0	0	0	0	0	0	0						0	0

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 03

ST. MARTIN	350	4003000331	PARKS BAYOU TECHE	V. LIFT - ELEC.	0*	82.0	0	0	0	0	0	0	0						0	0
ST. MARY	319	2390107051	LOUISA INTRACOASTAL CANAL	DBL. BASC. - ELEC.	4	134.0	0	2	0	0	0	0	0						2	0
ST. MARY	324	2410209141	CHARENTON BAYOU TECHE	SWING - ELEC.	0	32.5	4	9	15	10	14	7	21						80	11
ST. MARY	323	4083000201	OAKLAWN BAYOU TECHE	SWING - ELEC.	0	22.3	0	0	0	0	0	0	0						0	0
ST. MARY	322	4083100091	STERLING BAYOU TECHE	SWING - HYD.	0	17.2	6	1	19	23	29	26	29						133	19
ST. MARY	670	8510400171	ADELINE BAYOU TECHE	SWING - HYD.	0	37.0	3	4	6	5	12	10	12						52	7
ST. MARY	3069	8510900241	WILLOW STREET BAYOU TECHE	SWING - HYD.	0	16.3	0	0	4	6	1	0	1						12	2
VERMILION	14	0550600131	OLD ABBEVILLE VERMILION RIVER	V. LIFT - ELEC.	0	25.4	78	44	36	46	86	29	63						382	55
VERMILION	14	0553001081	ABBEVILLE BY-PASS VERMILION RIVER	V. LIFT - ELEC.	4	26.0	65	44	36	48	77	20	58						348	50
VERMILION	82	1940707511	PERRY VERMILION RIVER	V. LIFT - ELEC.	2	22.4	75	70	68	50	106	53	61						483	69
VERMILION	82	2070106671	LITTLE PRAIRIE VERMILION RIVER	SWING - HYD.	2	4.0	27	42	134	123	163	156	69						714	102
VERMILION	330	3970304251	BAYOU TIGRE BAYOU TIGRE	SWING - ELEC.	0	2.3	0	0	0	0	0	0	0						0	0
VERMILION	3147	8576605721	HUMBLE CANAL HUMBLE CANAL	PONTOON - HYD.	4	0.5	81	69	81	192	227	203	201						1054	151
VERMILION	1246	8576900011	WOODLAWN VERMILION RIVER	SWING - HYD.	0		44	26	25	30	35	1	33						194	28

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 05

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
OUACHITA	US 80	0010918151	LOUISVILLE AVENUE - OUACHITA RIVER	DBL. BASC. - ELEC.	0	166.5	1	0	2	0									3	1
OUACHITA	3280	8372200001	ENDOM BRIDGE - OUACHITA RIVER	SWING - ELEC.	0	166.0	1	0	2	0									3	1

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 08

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
RAPIDES	165	0150100111	GILLIS LONG / JACKSON ST. - RED RIVER	V. LIFT - ELEC.	0*	103.2	100	63	38	83	53	36	73	69					515	64

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 58

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
CATAHOULA	15	0260400001	CLAYTON - TENSAS RIVER	V. LIFT - ELEC.	0	27.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 07

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
CALCASIEU	12	0120100001	DEWEYVILLE, TEXAS SABINE RIVER	SWING-HAND	0	40.8	NEED NOT OPEN TO MARINE TRAFFIC PER 33 CFR 117													
CALCASIEU	27	0310400701	ELLENDER INTRACOASTAL	SEMI-HI-LEVEL V. LIFT - ELEC.	0	243.8	12	8	13	12	16	12	10	8					91	11
CALCASIEU	384	3820402351	BLACK BAYOU INTRACOASTAL	PONTOON - ELEC.	4	237.5	813	677	793	742	685	901	778	933					6322	790
CALCASIEU	378	8101204221	WEST FORK WEST FORK CALCASIEU	V. LIFT - ELEC.	0	5.0	0	0	0	0	0	0	0	0					0	0
CAMERON	27	0310303551	HACKBERRY KELSO BAYOU	SWING - HYD.	2	0.7	3	9	10	6	14	64	8	71					185	23
CAMERON	82	1940200001	GRAND CHENIER MERMENTAU RIVER	SWING - ELEC.	2	6.3	5	15	27	24	23	39	17	33					183	23
CAMERON	82	1940221101	SUPERIOR OIL COMPANY CANAL	SWING - ELEC.	1	2.0	42	114	62	27	10	52	41	43					391	49
CAMERON	384	1953000931	GRAND LAKE PONTOON INTRACOASTAL	PONTOON - ELEC.	4	231.4	756	602	731	743	753	842	792	898					6117	765
CAMERON	82	3840100001	SABINE LAKE CAUSEWAY SABINE LAKE CAUSEWAY	SWING - ELEC.			OPERATED BY TEXAS DOT													

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 61

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
ASSUMPTION	70	2320113011	PIERRE PART - BAYOU PIERRE PART	SWING - HYD.	3	1.0	7	19	1	0	0	0	15	45					87	11
ASSUMPTION	70	2320116621	BELLE RIVER - BELLE RIVER	PONTOON - HYD.	3	43.2	27	41	50	52	58	99	121	98					546	68
IBERVILLE	77	2190107251	GROSSE TETE INTERCOAST CANAL	SWING - HYD.	5	47.0	491	347	381	341	249	435	437	495					3176	397
IBERVILLE	3066	2300106531	INDIAN VILLAGE BRIDGE BAYOU PLAQUEMINE	SWING - HYD.	0	6.5	4	9	12	9	11	5	17	8					75	9
IBERVILLE	997	2300309551	PIGEON PONTOON LOWER GRAND RIVER	PONTOON - ELEC.	3	25.9	26	22	78	103	41	77	97	62					506	63
IBERVILLE	75	8241800081	BAYOU SORREL PONTOON LOWER GRAND RIVER	PONTOON - HYD.	4	38.4	524	407	399	445	271	456	471	529					3502	438
POINTE COUPEE	15	1770105911	OLD RIVER NAVIGATION - OLD RIVER NAVIGATION	V. LIFT - ELEC.			OPERATED BY US ARMY CORPS OF ENGINEERS													

2019
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUMMARY OF NAVIGATION OPENINGS - MOVABLE BRIDGES

Click here for operating schedules and open/closed status.

DISTRICT 62

PARISH	STATE ROUTE	STRUCTURE NUMBER	NAME OF BRIDGE/STREAM	TYPE DRAW	NO. OF TENDERS	MILE POINT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	AVG
LIVINGSTON	42	2600200001	PORT VINCENT - AMITE RIVER	SWING - HYD.	0	32.0	0	0	0	0	0	0	0	0					0	0
LIVINGSTON	16	2600207511	FRENCH SETTLEMENT - AMITE RIVER	SWING - HAND	0	21.4	0	0	0	0	0	0	0	0					0	0
LIVINGSTON	22	2600402731	CLIO - AMITE RIVER	SWING - HYD.	0	6.0	0	0	0	0	0	1	0	0					1	0
ST. TAMMANY	US 90	0060705291	WEST PEARL RIVER - WEST PEARL RIVER	V. LIFT - ELEC.	0	7.9	0	0	0	0	1	0	0	0					1	0
ST. TAMMANY	US 90	0060800001	EAST PEARL RIVER - EAST PEARL RIVER	SWING - ELEC.	2	8.8	0	23	16	23	40	36	26	31					195	24
ST. TAMMANY	22	2610600001	MADISONVILLE - TCHEFUNCTE RIVER	SWING - HYD.	4	2.5	102	114	158	208	333	306	241	248					1710	214
ST. TAMMANY	433	8522102481	BAYOU LIBERTY - BAYOU LIBERTY	SWING - HYD.	2	2.0	0	4	8	2	7	4	3	2					30	4
ST. TAMMANY	US 190	0131210841	LACOMBE - BAYOU LACOMBE	SWING - HAND	0*	6.8	0	0	0	0	0	0	0	0					0	0
ST. TAMMANY	433	8522106161	SLIDELL - BAYOU BONFOUCA	SWING - HYD.	2	7.0	12	10	24	19	28	18	39	19					169	21

A-19: MOVABLE BRIDGE LIST

On-System

On-System	District	Parish	Route	Feature intersected
000152	02	Jefferson	LA0018	HARVEY CANAL
000810	02	Jefferson	LA0302	BAYOU BARATARIA
000880	02	Lafourche	LA0182	BAYOU LAFOURCHE
000920	02	Lafourche	LA0001	INTRACOASTAL CANL
000930	02	Lafourche	LA0001	CO CANAL LOCKPORT
001030	02	Lafourche	LA0308	BAYOU LAFOURCHE
001304	02	Lafourche	LA0655	BAYOU LAFOURCHE
001312	02	Lafourche	LA0307	BAYOU BOEUF
001346	02	Lafourche	LA3220	BAYOU LAFOURCHE
001390	02	Orleans	US0090	CHEF MENTEUR PASS
001421	02	Orleans	US0090	IND CL/FRANCE RD/N.O. RR
001552	02	Orleans	US0011	LAKE PONTCHARTRAIN
002500	02	Plaquemines	LA0023	I C WATERWAY
002650	02	St. Bernard	LA0046	BAYOU LA LOUTRE
002830	02	St. Charles	LA0631	BAYOU DES ALLEMAND
003180	02	Terrebonne	LA3197	HOUMA CANAL
003220	02	Terrebonne	LA0024	CO. CANAL (BOURG)
003240	02	Terrebonne	LA0024	LITTLE CAILLOU
003390	02	Terrebonne	LA0315	FALGOUT CANAL
003412	02	Terrebonne	LA0315	BAYOU DULARGE
003432	02	Terrebonne	LA0057	BAYOU DULAC
003450	02	Terrebonne	LA0056	BOUDREAUX CANAL
003480	02	Terrebonne	LA0058	PETIT CAILLOU
003500	02	Terrebonne	LA0058	BAYOU TERREBONNE
003610	02	Terrebonne	LA0661	NAVIGATION CANAL
003620	02	Terrebonne	LA0661	BAYOU LACARPE
020267	02	Lafourche	LA0649	BAYOU LAFOURCHE
020319	02	Terrebonne	LA0055	HUMBLE CANAL
020352	02	Lafourche	LA0654	BAYOU LAFOURCHE
020354	02	Terrebonne	LA0661	BAYOU TERREBONNE
020374	02	Terrebonne	LA0057	BAYOU TERREBONNE
020375	02	Orleans	LA0039	INNER HARBOR NAV CANAL

On-System	District	Parish	Route	Feature intersected
020502	02	Lafourche	LA0657	BAYOU LAFOURCHE
020503	02	Terrebonne	LA3087	BAYOU TERREBONNE
102149	02	Orleans	LA1264	INTER COASTAL WATERWAY
200850	02	Terrebonne	LA0315	PROVOST BAYOU
200920	02	Lafourche	LA0308S	BAYOU LAFOURCHE
200940	02	Lafourche	LA0316	ICWW / BAYOU BLUE
206000	02	St. Charles	I0310	MISSISSIPPI RIVER
005322	03	Acadia	LA0091	B. PLAQ. BRULE/ESTHERWOO
005800	03	Iberia	LA0086	BAYOU TECHE/DUPERIOR ST
005860	03	Iberia	LA0671	BAYOU TECHE JEAN
005900	03	Iberia	LA0086	B TECHE DASPIT
006180	03	Iberia	LA0320	B TECHE (OLIVIER)
006200	03	Iberia	LA0344	B TECHE MORBIHAN
006210	03	Iberia	LA0344	BAYOU TECHE @ LOREAUVILL
006306	03	Iberia	LA3182	BAYOU TECHE
006406	03	Lafayette	LA0182	VERMILION R (PINHOOK RD)
006520	03	Lafayette	LA0092	VERMILION R @ MILTON
007170	03	Lafayette	LA0733	VERMILION R/ELOI BROUS.
007272	03	Lafayette	LA3073	VERMILION RIVER
008570	03	St. Martin	LA03361	BAYOU TECHE
008640	03	St. Martin	LA0092	BAYOU TECHE @ KEYSTONE
008690	03	St. Martin	LA0096	BAYOU TECHE ST M.
008700	03	St. Martin	LA0350	BAYOU TECHE PARKS
009130	03	St. Mary	LA0324	BAYOU TECHE
009190	03	St. Mary	LA0322	B TECHE STERLING
009272	03	St. Mary	LA0670	BAYOU TECHE
009280	03	St. Mary	LA3069	B TECHE FRANKLIN
009430	03	Vermilion	LA0014B	VERMILION R/ABBEVILLE

On-System	District	Parish	Route	Feature intersected
009460	03	Vermilion	LA 14 Bypass	VERMILION R/ABBEVILLE
009680	03	Vermilion	LA0082	VERMILION R PERRY
009690	03	Vermilion	LA0082	OLD ICC L PRAIRE
010130	03	Vermilion	LA0330	BAYOU TIGRE
030312	03	Iberia	LA0014	DELCAMBRE
030351	03	St. Mary	LA0319	INTRACOASTAL CANAL
030363	03	Iberia	LA0087	BAYOU TECHE
030410	03	Iberia	LA0083	PATOUT BAYOU
030430	03	Iberia	LA3156	BAYOU TECHE
200902	03	Vermilion	LA1246	VERMILION RIVER
302620	03	Iberia	LA3195	BAYOU TECHE
303140	03	Vermilion	LA3147	HUMBLE CANAL
040337	04	Caddo	I0049	I-220
040338	04	Caddo	I0220 TO I0049	GROUND
024400	05	Ouachita	US0080	OUACHITA RIVER-LOUISVILL
400916	05	Ouachita	LA3280	OUACHITA RIVER
031530	07	Calcasieu	LA0012	SABINE RIVER
031751	07	Calcasieu	LA0027	ICWW - ELLENDERS
032242	07	Calcasieu	LA0384	INTRACOASTAL WATERWAY
033353	07	Calcasieu	LA0378	W FORK CALCASIEU RIVER
033602	07	Cameron	LA0027	KELSO BAYOU/HACKBERRY
033700	07	Cameron	LA0082	MERMENTAU R./G.CHENIER
033730	07	Cameron	LA0082	SUPERIOR CANAL
033760	07	Cameron	LA0384	ICWW-SWEET/GRAND LAKE
037532	08	Grant	LA0008	RED RIVER, LA 1, UP RR
039502	08	Rapides	US0165B	RED RIVER, CITY STS.
047436	58	Catahoula	LA0015	TENSAS RIVER @ CLAYTON
051500	61	Assumption	LA0070	PIERRE PASS

On-System	District	Parish	Route	Feature intersected
051510	61	Assumption	LA0070	BELLE RIVER
054360	61	Iberville	LA0077	INTERCOASTAL WATERWAY
054472	61	Iberville	LA3066S	PLAQUEMINE BAYOU/IND VIL
054480	61	Iberville	LA0997	B PIGEON/LOWER GRAND R.
054730	61	Iberville	LA0075S	UPPER GRAND R/B SORREL
054900	61	Pointe Coupee	LA0015	OLD RIVER NAV. CANAL
610292	61	West Feliciana	LA0010	MISSISSIPPI RIVER
056360	62	Livingston	LA0042	AMITE RIVER @ P'VINCENT
056430	62	Livingston	LA0016	AMITE RIVER-FRENCH S'MEN
056502	62	Livingston	LA0022	AMITE RIVER @ CLIO
058710	62	St. Tammany	US0090	WEST PEARL RIVER
058750	62	St. Tammany	US0090	EAST PEARL RIVER
058930	62	St. Tammany	US0190	BAYOU LACOMBE
059482	62	St. Tammany	LA0022	TCHEFUNCTE R/MADISONVILL
060412	62	St. Tammany	LA0433	BAYOU BONFOUCA
620260	62	St. Tammany	LA0433	BAYOU LIBERTY

Off-System

Off-System	District	Parish	Route	Feature intersected
020127	02	Terrebonne	LOCAL ROAD	GRAND CAILLOU BAYOU
020232	02	Lafourche	LOCAL ROAD	BAYOU LAFOURCHE
020384	02	Lafourche	LOCAL ROAD	BAYOU LAFOURCHE
102254	02	Orleans	CITY STREET	INNER HARBOR NAVIGATION
200853	02	Terrebonne	LOCAL ROAD	TERREBONNE BAYOU
200855	02	Terrebonne	LOCAL ROAD	GRAND CAILLOU BAYOU
200860	02	Lafourche	LOCAL ROAD	BAYOU LAFOURCHE
200863	02	Lafourche	LOCAL ROAD	BAYOU LAFOURCHE
200866	02	Lafourche	LOCAL ROAD	BAYOU LAFOURCHE
200870	02	Terrebonne	LOCAL ROAD	PETIT CAILLOU BAYOU
200886	02	Lafourche	LOCAL ROAD	BAYOU LAFOURCHE
800923	61	Assumption	Bayou Dr W	BAYOU PIERRE PASS
203830	62	St. Tammany	N Causeway BLVD	LAKE PONTCHARTRAIN
203832	62	St. Tammany	CAUSEWAY SB	LAKE PONTCHARTRAIN

A-20: BORDER BRIDGE LIST

Texas	District	Parish	Route	Feature intersected
040421	04	Desoto	US0084	SABINE RIVER
040440	04	Desoto	US0084	SABINE RIVER
029902	07	Beauregard	US0190	SABINE RIVER
031530	07	Calcasieu	LA0012	SABINE RIVER
070215	07	Cameron	LA0082	SABINE LAKE
041570	08	Sabine	LA0006	TOLEDO BEND RES.
042700	08	Vernon	LA0008	SABINE RIVER @ BURR FERR
070173	08	Calcasieu	I-10	SABINE RIVER

Mississippi	District	Parish	Route	Feature intersected
500590	05	Madison	I0020	MISSISSIPPI RIVER
048070	58	Concordia	US0065	MISSISSIPPI RIVER
580690	58	Concordia	US0065	MISSISSIPPI RIVER
058750	62	St. Tammany	US0090	EAST PEARL RIVER
060190	62	St. Tammany	I0059	LOCAL RD EAST PEARL RIVE
060200	62	St. Tammany	I0059	LOCAL RD EAST PEARL RIVE
620288	62	Washington	LA0010	PEARL RIVER
620630	62	St. Tammany	I0010	EAST PEARL RIVER