

Pre-1946 Timber Review

Louisiana Statewide Historic Bridge Inventory



Prepared for

Louisiana Department of Transportation and Development

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1. Introduction

In accordance with Stipulation V.B.2 of the *Programmatic Agreement among the Federal Highway Administration, the Louisiana Department of Transportation And Development, the Advisory Council on Historic Preservation, and the Louisiana State Historic Preservation Officer Regarding Management of Historic Bridges in Louisiana* (PA), executed on September 21, 2015, the Louisiana Department of Transportation and Development (LADOTD) completed a “review of pre-1946 timber bridges to assess if any of the previous determinations that these bridges are not eligible would merit reconsideration.” Background information on the use of timber trestles in Louisiana, the methodology applied to assess such bridges, and results of the review are presented in this report.

2. Background

The background information below is an excerpt of contextual information on timber bridges from national and state historic contexts.

From the national historic context *A Context for Common Historic Bridge Types: NCHRP Project 25-25, Task 15* (October 2005):

In the United States, timber stringer bridges were amongst the earliest built, simple waterway crossings. Long after wood truss bridges had ceased to be competitive with metal truss bridges for use in short spans in the nineteenth century, timber beam bridges were still being built. Because of the structure's simplicity and readily available material (wood), the timber beam has endured to the present day in the form of rot-resistant timber laminated stringer, or beam, bridges. Today, these structures are built on low-trafficked, rural backcountry roads, private roads, or in national forests and parks.

From the state historic context *Historic Context for Louisiana Bridges: Louisiana Statewide Historic Bridge Inventory* (December 2013). Timber trestle bridges account for 21 percent of Louisiana's pre-1971 population.¹

The only timber highway bridges in Louisiana are timber trestles. Trestles, or "a succession of towers of steel, timber, or reinforced concrete, supporting short spans," were historically used for approach spans for highway and railroad bridges, but were also be used for main spans. Timber trestles represent a large percentage of the beam/girder bridge pool at 28 percent and are widespread through the state. There are a number of advantages to the timber trestle bridge, including that the bridge type could maintain ease grades when crossing deep ravines, it is easy to erect, and materials are abundant.² Timber trestles were one of the first types of bridges constructed in Louisiana, by railroads, long before a state highway department was organized. Due to their temporary nature, early examples were soon replaced.

The timber trestle was actually one of the earliest known bridge standard plans developed by state engineers. Completed in 1917, timber trestle standard plans were prepared for span lengths between 10 and 30 feet, with variables in deck and clear roadway width. General plan notes from the 1920s specified that timber trestle bridges were to be treated with creosote to resist rot and extend longevity. By 1926 creosoted timber bridges were being constructed across the state, as indicated in the April 1926 edition of *The Louisiana Highway Magazine*, where an image of a treated timber trestle is captioned, "Typical creosoted timber bridge in use on Louisiana's State Highway System. Such structures have exceptionally long life."³ The Department constructed timber trestle bridges throughout the twentieth century.

¹ The Louisiana Historic Bridge Inventory considered all bridges through 1970.

² National Research Council, *A Context for Common Historic Bridge Types*, prepared for the National Cooperative Highway Research Program, Transportation Research Council, National Research Council, by Parsons Brinckerhoff and Engineering and Industrial Heritage, 2005, 3-137 to 3-138.

³ Guillermo M. Sherwell, "The Economic and Social Effects of Highways," *The Louisiana Highway Magazine* 3 (April 1926), 10.

3. The Study Pool

To begin the review, Mead & Hunt, Inc. (Mead & Hunt) requested an updated list of pre-1946 timber bridges from the LADOTD. There are 52 pre-1946 timber bridges in the pool for review, all of them of the timber trestle type.⁴ As identified in the context, these bridges are comprised of substructure units, typically of timber, supporting short spans of timber beams creating the superstructure. These bridges have one or more spans with a typical individual span length of 19 feet. Overall structure length ranges from 20 feet to 457 feet. Bridge construction dates range from 1926 to 1945 (see Table 1).

Table 1. Pre-1946 timber population by date

Year built	No. of bridges
1926	1
1930	4
1931	7
1936	5
1938	1
1939	2
1940	14
1941	2
1942	5
1943	2
1944	7
1945	2

Standard plans were used by the State of Louisiana for timber structures as early as 1917. Standard plans continued to be developed and updated throughout the years to accommodate a range of site needs. Standard plans for individual spans range from 10 to 29 feet, with 19 feet being common. There are numerous timber standard plan drawings that demonstrate little differences in the superstructure aside from length and with minor variations in deck and clear roadway width.

A review of photographs for the pre-1946 pool of the timber trestle bridges shows that these simple beam form bridges are all very similar to each other in their materials, form, and design. Photographs of pre-1946 timber bridges in Appendix A demonstrate this similarity and lack of distinction. The similarity amongst the bridges also substantiates the use of standard plans for their construction. In comparing the pre-1946 timber trestle bridges with timber trestle bridges constructed from 1947 through 1970 there remains a similarity in materials, form, and design. All of the timber trestle bridges, regardless of date, are largely indistinguishable from each other and it is often difficult to identify a construction date for these bridges based on their similarity and lack of records and documentation for these bridges.

⁴ Bridges coded in the LADOTD’s database as “timber trestle with I-beam and concrete deck” and “timber trestle with I-beam stringer and timber deck” were not included in the review because these bridges do not have timber superstructures. Rather, they have a timber substructure (piers and abutments) and a steel superstructure with either a concrete or timber deck. Such types were evaluated previously as steel bridges. Timber bridges less than 20 feet were not considered in the review since all structures less than 20 feet were excluded from the project. Bridges previously determined not eligible were not reevaluated.

4. Evaluation Methodology

Mead & Hunt consulted a number of national and state studies to review approaches that have been used to evaluate the National Register of Historic Places (National Register) eligibility of timber structures. A summary of considerations used to determine National Register eligibility of timber bridges is provided in Appendix B. A typical challenge noted in these studies was the difficulty in documenting date of construction, builder, and construction/alteration history for this bridge type. Next, historians reviewed inspection data including information on date of construction, length and alterations, photographs, and standard plans for timber bridges in Louisiana to complete the evaluation. Application of National Register *Criteria A* and *C* was considered in this review.

A. Criterion A

In the initial evaluation, all pre-1971 bridge types, including timber, were reviewed for potential significance under *Criterion A*, which included consideration of the following areas:

- Transportation, including an association with an important route, major river crossings, and grade separation structures

- Politics/Government

- Conservation

In October 2013 the Louisiana State Historic Preservation Office (LASHPO), Federal Highway Administration (FHWA), and LADOTD agreed to the eligibility recommendations. At this time 33 bridges were determined eligible under *Criterion A*.

On January 16, 2016, new historic information was received for the Bud Bayou Bridge (Bridge 008900) in St. Martin Parish. This timber trestle bridge, located in the Longfellow-Evangeline State Historic Site, was identified by the State Historic Site Manager as a bridge that is believed to have been built by the Civilian Conservation Corps (CCC) as part of its road and bridge construction projects. A CCC camp was established at Longfellow-Evangeline in 1933 and the property became the first park of the Louisiana State Parks System in 1934. Research was conducted attempting to document the bridge's construction by the CCC and association with this Depression-era program. Based on the research (presented in Appendix C), the Bud Bayou Bridge was built in in late 1940 or early 1941 by the State Park Commission to replace a CCC bridge that had collapsed in this location. Therefore, the Bud Bayou Bridge is not recommended eligible under *Criterion A: Politics and Government* because it does not have a documented association with the CCC. This result was provided to the Site Manager.

No historic associations have been identified for any of the other timber bridges and, as a result, no further evaluation under *Criterion A* is recommended.

B. Criterion C

Three areas of consideration under *Criterion C* were considered as discussed below.

(1) High artistic value

This aspect of *Criterion C* considers bridges that were designed with outstanding architectural style as expressed in their overall form, aesthetic treatment, or applied ornamentation. Based on a review of photographs, timber bridges in the study pool are vernacular in form. No aesthetic treatment was found to be applied. Therefore, based on this evaluation, no timber bridges are considered to have the potential to possess high artistic value.

(2) Work of a master

This aspect of *Criterion C* considers bridges that express substantial evidence of the distinguishing characteristics of a master's (engineer, designer, fabricator, or builder) important work. To identify if any timber bridges reflected the work of a master, historians reviewed the statewide bridge historic context, inspection records, and the LADOTD's database information for the subject bridges and standard plans. In addition, no bridge plaques were found on any of the timber bridges that may have indicated a designer or builder. No timber bridges in the state are known to be the work of a master. Timber bridges in the state were largely constructed using the state's standard plans. Many variations of the standard plans were developed by the state transportation department for varying lengths and widths, demonstrating the popularity and practicality of the use of standard plans for this bridge type by the state.

(3) Distinctive characteristics of a type, period, or method of construction

Distinctive design or construction characteristics include patterns of features common to a particular bridge type, variations of features within bridge types, and evolutions/transitions that illustrate an important variation within an established bridge type. Bridges that may possess significance include those that:

- Illustrate the early use of a type in Louisiana
- Represent distinctive design features or subtype
- Demonstrate innovative or complex technological solutions related to the site
- Introduce or apply new materials, designs, and technologies
- Exhibit evolution or variation within a bridge type

An analysis of the 52 pre-1946 timber bridges included evaluating data reflecting construction date, length, and structural features to identify bridges that may display distinctive characteristics of a type, period, or method of construction. After considering each of the five ways a bridge could display distinctive characteristics, the results are as follows:

(a) Illustrate the early use of the type

The first timber bridges in Louisiana were built in the early 1900s and standard plans were in place by 1917. None of the bridges in the study pool date to the period before standard plans were in use in Louisiana for timber bridges.

The earliest extant timber bridge in the state is Bridge 038290, built in 1926 (see Figures 1 and 2 in Appendix A). The bridge is a four-span, treated, timber trestle structure with an overall span length of 78 feet. The longest individual span is the typical 19 feet. This bridge has a replacement steel guard rail and alterations to the substructure, including the encasement of three piles in concrete, the addition of four helper piles (an additional pile driven in to add support next to an existing pile), and the strengthening of the timber cap at bent 2 with an additional timber beam bolted to the cap. Bridge 038290 is noted in the project microfilm file of the LADOTD as standard plan B-20-60; however, there is no further record at LADOTD of this standard plan. The specific use of this standard plan or another in the construction of Bridge 038290 cannot be documented. Bridge 038290 is very similar in form and construction as other extant timber bridges.

Although this is the oldest extant timber bridge in the state, it was constructed nine years after the development of standard plans for this type and after the type was well established in the state. Therefore, it does not reflect the pre-standardization period of timber bridge construction, nor does it represent the earliest use of the timber trestle bridge type in Louisiana since there would have been examples constructed before the development of standard plans in 1917. Therefore, Bridge 038290 does not demonstrate significance under *Criterion C*.

(b) Represents distinctive design feature or subtype

Features including length or special configuration of structural components are ways a bridge can display distinctive design or subtype. The longest pre-1946 timber trestle examples were reviewed to identify if the overall length or individual main span length indicated a distinctive design feature or subtype. The majority of pre-1946 timber bridges have an overall length between 20 feet and 100 feet made up of one or more spans typically of 19 feet. Figures 3 and 10 through 14 in Appendix A show typical examples under 100 feet. Only five of the bridges have an overall length more than 100 feet. These bridges achieve their length through multiple individual spans of 19 feet combined to reach the length needed for a particular site. Figures 4 through 9 in Appendix A show examples of pre-1946 timber bridges over 100 feet. The combination of typical multiple 19-foot spans to achieve a longer bridge does not demonstrate a distinctive design or subtype. Therefore, the longer examples of the timber trestle type were not found to demonstrate significance under *Criterion C*.

The majority of pre-1946 timber trestle bridges have an individual maximum span length of 19 feet. Two bridges in the study pool have an individual span length over 19 feet: one at 29 feet (Bridge 008900, see Figure 3) and one at 20 feet (Bridge 600518, see Figures 15 and 16). Span lengths up to 29 feet are seen in the standard plans; therefore, an individual span length over 19 feet was not found to be a distinctive design feature or subtype of this bridge type and does not allow a bridge to demonstrate significance under *Criterion C*.

(c) Demonstrates an innovative or complex technological solution related to the site

Features, including length or special configuration of structural components, are ways that a bridge can demonstrate an innovative or complex technological solution related to the site. The longest pre-1946 timber trestle examples, as noted above, were reviewed to identify if the overall

length demonstrates an innovative or complex technological solution related to the site. In addition, engineering data for the study pool was reviewed to identify if any of the bridges had a significant skew in their design that may have been necessary for a particular site. This review did not identify any bridges with a significant skew or ones where their length demonstrated an innovative or complex technological solution related to the site. Therefore, no timber trestle type bridges were found to demonstrate significance under *Criterion C* for their demonstration of an innovative or complex technological solution related to the site.

(d) *Introduce or apply new materials, designs, and technologies*

Historians reviewed research materials and literature from the period along with bridge-specific information in the LADOTD's database and inspection records to identify if any bridges in the pool represent the introduction or application of new materials, designs, or technologies. No new materials, designs, or technologies were identified to be introduced or applied during the pre-1946 period of timber bridge construction in Louisiana. All of the pre-1946 timber bridges are constructed of treated timber and display similar design features. Therefore, there are no pre-1946 timber trestle bridges that were found to demonstrate significance under *Criterion C* for their introduction or application of new materials, designs, and technologies.

(e) *Exhibits evolution or variation within the type*

Historians reviewed photographs and engineering data to identify features of pre-1946 timber trestle bridges, including main span length, overall structure length, and form, that may indicate an evolution or variation within the type. Very little evolution or variation exists within the type since, as noted above, these structures are similar in materials, form, and design. The main variation is demonstrated in the overall length of the structures. The increased length is simply the addition of the same spans to the structure to achieve the desired length and therefore is not an evolution or variation of the engineering of the bridge. With the availability of state standard plans since 1917, it is not surprising that timber trestle bridges in the study pool exhibit very little evolution or variation. Minor variations within the standard plans are seen to address changes in the length or width of the structure to accommodate particular site needs, but the materials and overall superstructure design remained largely the same. Therefore, no timber trestle bridges were found to exhibit an evolution or variation within the type and therefore demonstrate significance under *Criterion C*.

5. Recommendation

Based on the reevaluation of timber bridges as outlined above and current documentation, no pre-1946 timber bridges were found to meet the National Register Criteria to be recommended as eligible for the National Register. A Solicitation of Views (SOV), as standard LADOTD procedure, will include project notification for all bridge projects, including timber bridges. In accordance with Stipulation V.B.1 of the PA, if new or additional information comes to light that may impact the National Register eligibility status of a particular bridge, the information will be provided to the FHWA and the recommendation will be reconsidered by the FHWA in consultation with the LADOTD and LASHPO.

Appendix A. Representative Timber Bridge Images



Figure 1. Bridge 038290 in Natchitoches Parish, built in 1926. The bridge has four main spans and an overall length of 78 feet. See Figure 2 for another view.



Figure 2. Bridge 038290, deck view. See Figure 1 for another view.



Figure 3. Bridge 008900 in St. Martin Parish, 1938. This bridge has five main spans, with the longest individual span—29 feet—within the study pool. Overall length is 86 feet.



Figure 4. Bridge 037640 in Grant Parish, 1931. This is the longest example in the study pool – 24 spans comprising 457 feet. See Figure 5 for another view.



Figure 5. Deck view of Bridge 037640 in Grant Parish, 1931. This is the longest example in the study pool – 24 spans comprising 457 feet. See Figure 4 for another view.



Figure 6. Bridge 027910 in Union Parish, built in 1936. Example of five or more spans – six main spans (maximum individual span length of 19 feet) comprising an overall length of 115 feet.



Figure 7. Bridge 800030 in Grant Parish, built in 1931. Example with five or more spans – 12 main spans (maximum individual span length of 19 feet) comprising an overall length of 223 feet.



Figure 8. Bridge 044540 in Vernon Parish, 1944. Example with five or more spans – seven spans comprising an overall length of 135 feet. See Figure 9 for another view.



Figure 9. Bridge 044550 in Vernon Parish, 1944. Example with five or more spans – 10 spans comprising an overall length of 191 feet. See Figure 8 for another view.



Figure 10. Bridge 041090 in Rapides Parish, 1940. Example five or more spans – 16 spans comprising 78 feet.



Figure 11. Bridge 047070 in Caldwell Parish, 1931. Example with five or more spans – five spans totaling 97 feet.



Figure 12. Bridge 047050 in Caldwell Parish, 1931. Example with five or more spans – five spans comprising an overall length of 97 feet.



Figure 13. Bridge 065000 in Washington Parish, 1942. Example with five or more spans – five spans comprising an overall length of 97 feet.



Figure 14. Bridge 400413 in Ouachita Parish, 1942. Example with five or more spans – five spans comprising an overall length of 80 feet.



Figure 15. Bridge 600518 in Sabine Parish, 1940. Example of an individual span over 19 feet – four spans comprising an overall length of 77 feet. Longest individual span is 20 feet. See Figure 16 for another view.



Figure 16. Bridge 600518 in Sabine Parish, 1940. Example of an individual span over 19 feet – four spans comprising an overall length of 77 feet. Longest individual span is 20 feet. See Figure 15 for another view.

Appendix B. Approach to Timber Evaluation in Other Bridge Studies

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A sampling of national and statewide inventories were reviewed in the preparation of this evaluation of timber bridges. The following is a summary of the approaches to evaluate timber bridges by study.

Nationwide

National Research Council. *A Context for Common Historic Bridge Types*. Prepared for the National Cooperative Highway Research Program, Transportation Research Council, National Research Council, by Parsons Brinckerhoff and Engineering and Industrial Heritage, 2005.

Significance assessment: Timber stringer bridges have a relatively low level of significance within the context of this study. Very old (pre-twentieth century) examples would possess significance as an early representative example of the type if they retain integrity. Character-defining features include the longitudinal beams (or stringers) and often the pile bents. Railings and abutments may or may not be considered character-defining features. Intact examples in parks are also significant as they generally have scenic values and often possess additional significance for their association with parks and/or Depression-era federal work programs. If a stringer bridge could be identified as having been built according to the standard plans of the state transportation departments, it would also be considered significant within the context of this study. One problem with timber stringers and integrity is that often maintenance results in the loss of the structure's materials to a point where little will remain of the historic fabric.

States

North Dakota (1997)

National Register of Historic Places. Historic Roadway Bridges of North Dakota, Statewide, North Dakota. National Register #64500380.

- The report states that a timber bridge may be significant under *Criterion A* if it is documented as being designed by the State Highway Department after 1928
- A bridge may be significant under *Criterion C* if it is a timber stringer or timber trestle bridge with a documented date of construction and/or builder. A known construction history is quite uncommon because they are "smaller and less conspicuous on the landscape" and "their small size makes their construction less likely to be recorded in historic documents." Those with a documented construction history are significant in documenting the historical and engineering lineage of timber bridge design and construction in the state.
- A bridge may possess significance under *Criterion C* if it is a bridge with a documented date of construction as the oldest examples.
- Representative examples of timber stringer and timber trestle bridges. "Since few timber stringer and timber trestle bridges are represented through other registration requirements, examples based on integrity of design or unusual features should be selected."

- For integrity, a bridge needs to retain all features including railings (if any) and abutments since they are of such simple design. It is acceptable to have replacement materials of the same type used during the period of significance. The original deck is not necessary.

New York (2002)

Mead & Hunt, Inc. and Allee, King, Rosen & Fleming, Inc. *Evaluation of National Register Eligibility: Task C3 of the Historic Bridge Inventory and Management Plan*. Prepared for the New York State Department of Transportation and the Federal Highway Administration, January 2002.

- Timber was found to be an uncommon type; only three pre-1930 timber beams are found in the state. All examples were found to exhibit features common to the type and significant because they were uncommon.
- Replacement of original fabric using historically compatible materials is not a detriment to potential eligibility.

California (2004)

Hope, Andrew, California Department of Transportation. *Caltrans Statewide Historic Bridge Inventory Update: Survey and Evaluation of Common Bridge Types*. November 2004.

- California is home to 16 extant timber bridges built before 1930, three of which are before 1920.
- None are potentially significant. The report noted that timber construction was a well-established technology before the earliest examples in California. None of the oldest bridges of this type are significant for their age.
- None of the timber bridges exhibit technical innovations, ornamental embellishments, or any other characteristics that would make them significant under National Register *Criterion C*.
- None of the timber bridges had the potential for significance under *Criterion A*.

Oregon (2004)

Heritage Research Associates, Inc. *Slab, Beam & Girder Bridges in Oregon: Historic Context Statement*. Prepared for the Oregon Department of Transportation, May 2004.

- The report states: "Integrity of design is the primary consideration for eligibility of this type (slab, beam and girder) of structure."
- A timber bridge in the state is potentially eligible:
 - Under *Criterion A* if it retains integrity of location, design, setting, materials, and workmanship and has a clear association with the development of transportation resources that have made a contribution to the broad patterns of history.

- Under *Criterion C* if it retains integrity of location, design, setting, materials, and workmanship. A bridge can possess significance if it was built prior to 1924 and is comparable in significance to other bridges previously determined eligible. If built between 1924 and 1945 it must be comparable in significance to bridges previously determined eligible, have intact original railings and decorative elements, and have at least one of the following:
 - Special structural design features associated with a particular site.
 - A design that overcame significant engineering obstacles.
 - No historic-period alterations that obscure character-defining features above the road deck.

Arizona (2008)

FRASERdesign and EcoPlan Associates, Inc. *Bridges: Arizona Historic Bridge Inventory*. Prepared for the Arizona Department of Transportation, January 2008.

- Under *Criterion C* significant examples are those early examples (examples built before the Depression are rare) or representative multi-span examples (five spans or more, of which only four are extant).
- Under *Criterion A* significant examples are those that are early and/or prominent examples of the Arizona State Engineer or State Highway Department.

Appendix C. Additional Information on Bridge 008900

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The Longfellow Evangeline State Historic Site Manager reported that it is believed that the Bud Bayou Bridge (Bridge 008900) was built in 1938 by the Civilian Conservation Corps (CCC). Biennial reports of the State Park Commission of Louisiana indicate that it was actually built in late 1940 (after October 28) or very early 1941, and construction was carried out by the State Park Commission (Wood 1942:8, 28-29).

The CCC worked in what was then Longfellow Evangeline State Park from October 1933 to October 1934, and again from 1936 to 1938 (McLaughlin, 40-45). They apparently erected the predecessor to the current Bud Bayou Bridge in 1936 (Simoneaux 1938, 90, between pages 8 and 9, between pages 102 and 103; Simoneaux 1940, 8). Built for pedestrians, the CCC bridge was apparently wide enough to accommodate vehicles, but had "long been condemned to traffic" by 1940 (Wood, 29). As reported in the New Orleans States on October 28, 1940, the keeper of the park tore down the CCC bridge, stranding a vehicle on the "island" bordered by Bud Bayou and Bayou Teche. The current vehicular bridge was quickly erected to replace the CCC bridge (Wood, 8, 29).

Sources:

McLaughlin, Stephen Edward. *The Role of the Civilian Conservation Corps in the Founding of Louisiana's State Parks System*. Master's Thesis, December 1944.

Simoneaux, N.E., ed. *Second Biennial Report of the State Parks Commission of Louisiana, 1936-1937*. New Orleans, La.: State Parks Commission, 1938.

Simoneaux, N.E., ed. *Third Biennial Report of the State Parks Commission of Louisiana, 1938-1939*. New Orleans, La.: State Parks Commission, 1940.

Wood, Carroll L. Jr., ed. *Fourth Biennial Report of the State Parks Commission of Louisiana, 1940-1941*. New Orleans, La.: State Parks Commission, 1942.