WEST PEARL RIVER BRIDGE
(Bridge Recall No. 058710)
Carries U.S. Route 90 (US 90) over West Pearl River
Slidell
St. Tammany Parish
Louisiana

HAER LA-31
HAER LA-31

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

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Location: Carries U.S. Route 90 (US 90) over West Pearl River near the city of Slidell, St. Tammany Parish, Louisiana.

The West Pearl River Bridge (Bridge Recall No. 058710) is located at latitude 30.231204 north, longitude -89.668732 west.[1] The coordinate represents the center of the bridge. It was obtained in 2016 by plotting its location in Google Earth. The location has no restriction on its release to the public.

Present Owner: State of Louisiana.

Present Use: Vehicular and pedestrian traffic. When in its open position, the bridge allows for marine traffic on the West Pearl River.

Significance: The West Pearl River Bridge possesses significance as one of four bridges constructed to carry US 90/Old Spanish Trail over the Pearl River in St. Tammany Parrish in the early 1930s. The bridge is an essential part of the Rigolets-Pearlington highway shortcut connecting New Orleans to the Mississippi Gulf Coast. Construction of the shortcut created a more direct and efficient route between Louisiana and Mississippi and made a significant contribution to the broad patterns of Louisiana's transportation history.

The West Pearl River Bridge is also significant as an important variation within the vertical lift bridge type and is one of the earliest remaining examples of this type within Louisiana. The bridge is vertical lift span-drive bridge with a Waddell and Harrington configuration. This variation is demonstrated in the location of the drive machinery on the movable span that operates uphaul and downhaul ropes to raise and lower the span. The West Pearl River Bridge was determined eligible for listing in the National Register of Historic Places (National Register) in 2012 under *Criterion A: Transportation* and *Criterion C: Design/Engineering* at the state level of significance.[2]

Historian(s): Shannon Dolan, Cultural Resource Specialist, and Robert M. Frame, Senior Cultural Resource Specialist; Mead & Hunt, Inc.; 2017.

Project Information: This documentation was prepared as mitigation to fulfill Stipulation IX.5 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*

[1] The bridge is also known as Structure No. 62520060705291.

[2] Coastal Environments, Inc., "Determination of Eligibility for the Pearl River Bridges, Route US 90, St. Tammany Parish, Louisiana," February 2012.

Historic Preservation Officer Regarding Management of Historic Bridges in Louisiana, dated August 18, 2015, and executed September 21, 2015. The Louisiana Department of Transportation and Development (LADOTD) retained Mead & Hunt to prepare this document. It was prepared by cultural resource specialist Shannon Dolan and senior cultural resource specialist Robert M. Frame of Mead & Hunt. Dietrich Floeter completed the photography.

Part I. Historical Information

A. Physical History:

1. **Date(s) of construction:** 1933.

2. **Engineer:** Louisiana Highway Commission (LHC).

3. **Builder/Contractor/Supplier:** W. Horace Williams Company, New Orleans.

4. **Original plans and construction:** Copies of the plan sheets are available in the General Files room at the Louisiana Department of Transportation and Development's (LADOTD's) Baton Rouge headquarters. The West Pearl River Bridge plans were approved in October 1932. The truss, towers, counterweights, operator's house, deck, and approach spans were constructed using LHC Standard Plan S-L-2, "110-Foot Vertical Lift Span 24-Foot Roadway Double Curbs"; "Standard Plan Operator's House 110'-0-Foot Vertical Lift Span 24-Foot Roadway"; and "(C-G-32) for 7 28-Foot Reinforced Concrete Deck Girder Spans."[3]

5. **Alterations and additions:** The bridge has had minimal alterations and retains good integrity with the original moveable truss configuration, towers, operator house, counterweights, sheaves, concrete piers, and concrete approaches and substructure. According to LADOTD records, the lights and gates on the structure were converted to electrical operation in 1954. The bridge was also repaired in 1956 after being struck by a tugboat. Traffic warning lights were installed in 1964 and by 1968 new electrical service was installed. The truss was sandblasted and painted in 1978.[4] Additional alterations include the removal of lighting on the bridge approach spans and the replacement of the traffic gates.[5]

[3] Louisiana Highway Commission, "Standard Plan: General Layout 110'-0 Vertical Lift Span 24'-0 Roadway Double Curbs," October 1932, available in the General Files room, Louisiana Department of Transportation and Development, Baton Rouge, La.

[4] Louisiana Department of Transportation and Development, "Project 006-07-0017," *trns.Port Systems Database*, available at the Louisiana Department of Transportation and Development, Baton Rouge, Louisiana.

[5] Coastal Environments, Inc., "Determination of Eligibility for the Pearl River Bridges, Route US 90, St. Tammany Parish, Louisiana," February 2012, 13.

B. Historical Context:

Historical background

Since the LHC's inception in 1921 (replacing the State Highway Department), the agency's Bridge Department was responsible for the design and construction of many of Louisiana's bridges, including the development of standard plans for timber, steel, and concrete structures.[6] However, the Bridge Department prepared unique design plans as needed for specific projects, which resulted in the construction of such notable bridges as the Mermentau River Bridge, East and West Pearl River Bridges, and Pass Manchac Bridge.[7] Projects with only bridges were handled by the Bridge Department and those with both roads and bridges were completed by the office engineer with assistance from the bridge engineer.[8]

Under Huey Pierce Long's governorship in the late 1920s and early 1930, Louisiana's infrastructure improved significantly as a result of his ambitious road and bridge program. He reorganized the LHC shortly after he took office in 1928 and implemented several small- and large-scale bridge-building programs and roadway improvement projects.[9] It was during this time the LHC entered a period of rapid growth and building across Louisiana. A program to fill in the gaps of the fledgling State Highway System was adopted, along with long-term goals of crossing major rivers such as the Mississippi and the Pearl. The programs became increasingly popular with the public because they created many jobs and visible progress during the Great Depression.[10]

Construction of the West Pearl River Bridge

The West Pearl River Bridge was built under Long's tenure as part of the Rigolets-Pearlington shortcut connecting Louisiana and Mississippi. It was designed and constructed by the LHC in 1932 and 1933, respectively.[11] The shortcut eliminated expensive ferry crossings and created a direct route between New Orleans and Pearlington, Mississippi, and ultimately the gulf coast by realigning US 90 (Old Spanish Trail) through what was once perceived as impenetrable swamps and bayous.[12] In September 1932 the

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[6] Louisiana Highway Commission, *Biennial Report of the Louisiana Highway Commission of the State of Louisiana 1922-1924* (Baton Rouge, La.: Louisiana Highway Commission, 1924), 93, 95.

[7] Louisiana Highway Commission, *Biennial Report of the Louisiana Highway Commission of the State of Louisiana 1922-1924*, 93, 95.

[8] Louisiana Highway Commission, *Biennial Report of the Louisiana Highway Commission of the State of Louisiana 1922-1924*, 93.

[9] Louisiana Highway Commission, *Fifth Biennial Report of the Louisiana Highway Commission* (Baton Rouge, La.: Louisiana Highway Commission, 1930), 9.

[10] William Ivy Hair, *The Kingfish and His Realm: The Life and Times of Huey P. Long* (Baton Rouge, La.: Louisiana State University Press, 1991), 192.

[11] Recall No. 058750 (extant).

[12] Recall No. 058750 (extant).

LHC held a public hearing to solicit input regarding proposed plans to construct the shortcut.[13] The BPR approved the plans in October 1932, and one month later the LHC had accepted bids for the project.[14] Construction of the roadway and bridges was made possible by regular and emergency federal aid. According to the LHC's seventh biennial report:

> In the fall of 1932 and the spring of 1933, an Emergency Federal Aid appropriation was made available which was used in part by the Commission in constructing the so-called Rigolets-Pearlington shortcut, involving the bridges over West Pearl River, West Middle River, Middle Middle River, East Middle River, and East Pearl River.[15]

Based on the title page of the plan sheets, the West Pearl River Bridge was constructed under Federal Aid Project (F.A.P.) E-202-D.[16] It was constructed using LHC Standard Plan S-L-2, "110-Foot Vertical Lift Span 24-Foot Roadway Double Curbs"; "Standard Plan Operator's House 110'-0-Foot Vertical Lift Span 24-Foot Roadway"; and "(C-G-32) for 7 28-Foot Reinforced Concrete Deck Girder Spans."[17] Harry Henderlite was the construction supervisor who oversaw construction of the shortcut, which ran along portions of the Old Spanish Trail to the Mississippi state line, where it was continued by the Mississippi Highway Commission to the gulf.[18] The contract for construction of all five bridges was awarded to the W. Horace Williams Company of New Orleans for $404,652. [19] Construction of the West Pearl River Bridge was completed in the fall of 1933. The 1933 US 90 Bridge over the East Pearl River provided the final link in this 22-mile shortcut.[20]

Engineering background

The West Pearl River Bridge is an example of a Waddell-Harrington vertical lift bridge. In 1872 Squire Whipple patented the first design for short vertical lift bridges that required minimal vertical movement. However, it was not until John Alexander Low Waddell designed the South Halsted Street Bridge in Chicago in 1894 that the first large-scale vertical lift bridge was constructed in the U.S. His design ushered in a new era in movable bridge design by minimizing river-channel obstructions inherent in

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[13] "Engineer Plans Hearing on Span Proposals Today: Louisiana Highway Board's Bridge Application Get Attention," *Times-Picayune*, September 23, 1932.

[14] Coastal Environments, Inc., "Determination of Eligibility for the Pearl River Bridges, Route US 90, St. Tammany Parish, Louisiana," February 2012, 6–7.

[15] Louisiana Highway Commission, *Seventh Biennial Report of the Louisiana Highway Commission* (Baton Rouge, La.: Louisiana Highway Commission, 1934), 149.

[16] Louisiana Highway Commission, "Plans of Proposed State Highway F.I.-75(9) & F.I.-116(11) State Project No. 1-03-21 & 1-04-17 Fillmore - McIntyre Hwy. Bossier & Webster Parish," March 1954, 1, available in the General Files Room, Louisiana Department of Transportation and Development, Baton Rouge, La.

[17] Louisiana Highway Commission, "Standard Plan: General Layout 110'-0 Vertical Lift Span 24'-0 Roadway Double Curbs," October 1932, available in the General Files room, Louisiana Department of Transportation and Development, Baton Rouge, La.

[18] "Louisiana Ready," *Biloxi Daily Herald* (Mississippi), 19 September 1932.

[19] 24-Mile Reduction in Distance Assured on Completing Task, *Times-Picayune*, Sunday, 7 May 1933, B-2.

[20] Recall No. 058750 (extant).

swing-span bridges and improving the speed of bridge movement. In 1907 Waddell entered into a partnership with John Lyle Harrington, and the pair designed several vertical lift bridges that became the foundation for vertical lift bridge design in the twentieth century.[21]

As one of the three basic types of moveable bridges (along with swing span and bascule), vertical lift bridges are commonly found in flat terrain where the cost of long approaches to gain high-level, fixed-span crossings is prohibitive. Advantages of this bridge type included rapidity of operation, adjustable openings depending on the size of the vessel, the ability to build in congested areas adjacent to other bridges, and a clear navigation channel. This type of bridge consists of a rigid, horizontal, movable span supported between two towers. The movable span remains horizontal at all times, whether fully opened, fully closed, or anywhere in between. The movable span is balanced by large counterweights, which are connected to the span on each end by heavy steel counterweight ropes that are carried over the tops of the two towers on large sheaves, which are grooved steel wheels. The combined weight of the two counterweights (one at each tower or span end) equals the weight of the lift span, providing balance in order to reduce the force needed to move it vertically up and down. To move the counterweighted span, the drive machinery needs to provide only enough force to overcome friction and wind resistance.[22]

Vertical lift bridges come in three variations based on the configuration of the drive mechanism: the span drive, tower drive, and tower drive with connected towers. The names come from the location of the machinery used to raise and lower the span. Tower drives have the machinery at the top of each tower, while span drives have the machinery on the movable span. Tower drive with connected tower vertical lift spans have machinery located on a fixed span between the two towers.[23]

The West Pearl River Bridge is a span-drive type. In the span-drive configuration, the driving mechanism is separate from the counterweight ropes, which are carried on free-turning sheaves that are not powered. Instead of powered sheaves, separate sets of wire ropes are installed to provide force to move the span in an upward or downward direction. These are termed “uphaul” and “downhaul” ropes. Since the span is balanced by the two counterweights, the uphaul and downhaul ropes provide only minimal force. They are powered by the lift machinery located on the movable span itself and guided from the motor and gears to the span by a series of small wheels and pulleys.

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[21] Parsons Brinckerhoff and Engineering and Industrial Heritage, *A Context for Common Historic Bridge Types* (prepared for The National Cooperative Highway Research Program, Transportation Research Council, and National Research Council, October 2005), 3–120, http://onlinepubs.trb.org/onlinepubs/archive/NotesDocs/25-25(15)_FR.pdf.

[22] Parsons Brinckerhoff and Engineering and Industrial Heritage, *A Context for Common Historic Bridge Types*, 3–121; Mead & Hunt, Inc., *Historic Context for Louisiana Bridges* (prepared for the Louisiana Department of Transportation and Development, December 2013), 75–78.

[23] Mead & Hunt, Inc., *Historic Context for Louisiana Bridges*, 75–78.

Part II. Structural/Design Information

A. General Statement:

1. Character: The West Pearl River Bridge is a vertical lift bridge and an integral part of the Rigolets-Pearlington shortcut between Louisiana and the Mississippi Gulf Coast.

2. Condition of fabric: Good.

B. Description: The West Pearl River Bridge is located approximately 30 miles northeast of New Orleans and carries two lanes of US 90 on an east/west alignment over the West Pearl River in St. Tammany Parish, Louisiana. Constructed in 1933 using LHC's standard plans, the overall length of the bridge is 568'-0." The bridge's main span is a 110'-0" vertical lift main span with operator house and a 33'-0"-long lift tower span on each end. The bridge has seven 28'-0" reinforced-concrete approach spans on each side totaling 196'-0". The bridge has a posted load of 35 tons, vertical roadway clearance of 14'-7", and a vertical clearance of 18'-0" above the waterway.

Main span
The bridge is a Waddell-Harrington-type, span-drive, vertical lift bridge with the drive machinery and operator's house mounted on the top of the lift span. The 110'-0" lift span is a riveted, five-panel, Pratt truss modified to accommodate a lifting girder added to each end. The upper chord is built up with rolled channels riveted with a cover plate on top and V-lacing on the bottom. The extensions of the top chord to the lift girders on each end are rolled channels with batten plates on top and bottom. The lifting girder is a transverse rolled I-beam. The truss verticals and diagonals are rolled I-beams with the exception of the center diagonals, which are angles with batten plates.

The operator's house and lift machinery for the main span are mounted on a platform constructed of rolled I-beams centered between the upper chords. Steel-plate walkways surround the four sides of the operator's house and extend along the centerline of the span to each end, where they provide access to machinery at the span ends above the lift girder. The walkways are carried on top of the upper truss bracing, which is comprised of angles and V-lacing.

Operating machinery includes two geared drums, one on each side of the operator's house. The drums store the uphaul and downhaul ropes that extend from the drums to the end of the truss in each direction, passing through vertical steel guides midway between the operator's house and the lifting girder. At the girder the ropes pass through deflector sheaves located at each corner of the truss. The deflector sheaves provide a 90-degree turn up or down for each rope. The uphaul ropes extend to the top of the lift towers and the downhaul ropes extend to the base of the towers. To lift the span, the uphaul ropes are wound back on the drums and the downhaul ropes let out. To lower the span, the action is reversed.

The weight of the lift span is balanced by two large concrete counterweights, one in each lift tower. By keeping the lift span balanced, it can be moved up and down by the uphaul and downhaul ropes with very little power. Sets of six counterweight ropes are connected at each corner of the span to the lift girder. The other ends of the counterweight ropes are connected to the concrete counterweights in the lift towers. The counterweight ropes extend up and over the large sheaves at the tops of the lift towers. When the span is in the closed or down position, it is locked in place to avoid movement while carrying traffic. The locks are controlled from the operator's house by a longitudinal shaft that is located underneath the upper chord of the truss, parallel to the walkway. The longitudinal shaft secures the end locks mounted on the lift tower column.

Lift towers

Located adjacent to the lift span are the two lift towers that contain the concrete counterweights, and the vertical tracks that guide the list span as it moves. The towers are built from an LHC standard plan. Each tower is 75'-6" tall and comprised of built-up members with a wide base that tapers up towards the sheaves. The 30'-0" length of each tower base constitutes a span (spans 8 and 10) on each side of the lift span (span 9). Each tower supports two cast steel sheaves at the top and a narrow steel work platform surrounded with gas pipe railing with ball fittings. The sheaves and platform are accessed by a metal ladder mounted on the tower. The west tower has a steel-cage ladder and the east tower ladder is open. A single-rail metal railing is mounted on the parapets of the tower and lift spans. [24]

Operator's house

The operator's house follows the S-L-2 standard plan. It is a one-story frame building with rectangular plan that is 16'-0" north-south by 20'-0" east-west. It is clad in clapboard, has a low-pitched hip roof, and rests on a platform comprised of rolled I-beams. The low gable roof is covered with standing-seam metal with a simple wood cornice. The east facade features paired, one-over-one, double-hung, sash windows with simple surrounds with one visible entrance door and one door or window, covered with plywood. The entrance is a slightly recessed wood-panel door that appears to have had the window opening downsized and replaced with a smaller, single-pane, fixed light. The west facade has a slightly recessed wood panel entrance door at the southwest corner. The door appears to be original, with a large fixed-light window. Three, one-over-one, double-hung, sash windows with simple wood surrounds are also located on this facade. The north and south facades are identical and each features three, one-over-one, double-hung, sash windows with simple surrounds. The walkway outside the house has non-skid plates.

According to the plans, the interior of the operator's house originally had two gas engines; an end lock drive; control panel; reducer; Kohler plant, two-kilowatt, 110-volt direct current; span position indicator; and tile floor on top of concrete. A filler pipe for a 150-gallon gasoline tank is suspended from beams below the floor.[25] The bridge was converted from gas to electric power by October 1968.[26]

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[24] Louisiana Highway Commission, "Standard Plan: General Layout 110'-0' Vertical Lift Span 24'-0' Roadway Double Curbs," Sheets 28-31.

[25] Louisiana Highway Commission, "Standard Plan Operator's House 110'-0' Vertical Lift Span 24'-0' Roadway," 1932, 32, 35.

[26] State of Louisiana, Department of Highways, "S.P.# 6-07-24 West Pearl River Bridge U.S. 90," 1968, n.p., available in the General Files Room, Louisiana Department of Transportation and Development, Baton Rouge, La.

Substructure
Each of the two lift towers is supported on two reinforced-concrete piers. Each pier is comprised of two cylindrical concrete columns with a full-height concrete web wall between columns. Vertically, the piers are constructed in two levels, with a reduction in column and wall dimensions at the upper level. The piers are built on concrete foundations on timber pilings. The pier tops have concrete caps with rounded ends to complement the pier columns. The lift-tower columns at the lift span, on the two center piers (piers 2 and 3), have fixed bearings. The rear lift-tower columns on the outside piers (piers 1 and 4) have rocker expansion bearings. When closed, the lift span rests on bearing seats adjacent to the lift-tower fixed bearings on the pier cap.

Approach spans
According to the as-built plans, the approach spans consist of seven reinforced-concrete deck girder spans of approximately 28' on each end. Expansion joints were added to the concrete deck above the bents and piers. The approach spans have a concrete post and single rail configuration mounted on the parapets.

The approach spans are supported on precast concrete pile bents with square piles and simple rectangular concrete caps. End bents are used in place of abutments. Small concrete parapets with single railing segment rest on each end of the pier caps. Located on the approach spans on both sides of the lift towers are pairs of drop-arm crossing barriers to stop traffic when the bridge is open to navigation. With the crossing barriers are signal lights to control traffic movement.

Other features
A timber fender system in the river on each side of the bridge provides for a 93'-2"-wide navigation channel. Modern navigational lights are mounted on the fenders. A concrete curb and concrete parapet extend the length of the bridge along both sides. On the tower spans and lift span, a single-rail metal railing is mounted on the parapets.

C. Site Information: The West Pearl River Bridge spans the Pearl River in St. Tammany Parish, Louisiana. It is located approximately 30 miles northeast of New Orleans and carries US 90 over the West Pearl River. The river originates from the confluence of the two creeks located in Neshoba County, Mississippi, and winds its way south into St. Tammany Parish before emptying into the Rigolets. The surrounding landscape consists of deciduous trees and vegetation, with some commercial recreational development on the west side of the river.

Part III. Sources of Information

A. Primary Sources:

Coastal Environments, Inc. "Determination of Eligibility for the Pearl River Bridges, Route US 90, St. Tammany Parish, Louisiana," February 2012.

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Mead & Hunt, Inc. *Historic Context for Louisiana Bridges*. Prepared for the Louisiana Department of Transportation and Development, December 2013.