

HISTORIC AMERICAN ENGINEERING RECORD

JUDSONIA BRIDGE

HAER No. AR-51

LOCATION: White County Route 66 spanning the Little Red River at Judsonia, Arkansas.

UTM: 15/3839610/654230

Quad: Judsonia

**DATE OF
CONSTRUCTION:** 1924

CONTRACTOR: R.L. Gaster Construction Company, Little Rock, Arkansas.

PRESENT OWNER: White County, Arkansas.

PRESENT USE: Vehicular Bridge

SIGNIFICANCE: The Judsonia bridge, completed in 1924, is significant as the only known swing bridge in Arkansas designed as a cantilever. Besides adding an aesthetic touch, the cantilever-like peak on the top of the bridge structurally aids in centering the weight over the center pivot and supporting the ends when the bridge is in an open position. In addition, the bridge was part of a national modernizing movement to improve roads giving the town of Judsonia access to outlying regions on the opposite side of the river.

HISTORIAN: Kathryn Steen

DESCRIPTION BY: Corinne Smith

Arkansas Historic Bridge Recording Project, 1988.

TOWN HISTORY

Judsonia, Arkansas, is a small town (population 2025) lying on the banks of the Little Red River. The peaceful appearance today of this White County community belies its rather colorful past.

Originally named Prospect Bluff, this little river landing was one stop on a navigable route down the Little Red River to the White River and on to the Mississippi. Early businesses, several of which were saloons, crowded the north bank of the river.(1) Following the Civil War, Prospect Bluff underwent a major transformation as a group of northern colonists arrived in 1870 with a vision of a southern university. In 1871, a charter for the Baptist University--a one-building college--was granted. The northerners took over by establishing a ban on alcohol sales and changing the town's name to Judsonia in honor of Adoniram Judson, the first Baptist missionary to leave America.(2)

The colonists of the north brought more than a straight-laced society--they brought strawberries. From the plant's first appearance in the 1870s, the industry grew with the encouragement of the railroad and steamboat operators. Supporting businesses such as container manufacturers were appearing by the 1880s. The farmers reached peak output in 1928 before strawberry production declined in the early 1930s.(3)

Distribution of the strawberries was made possible by the railroads. By 1873, Jay Gould's St. Louis, Iron Mountain and Southern Railroad had built a line through Judsonia after purchasing the land from the Cairo and Fulton. In 1917, Missouri Pacific took over the line, which included a swinging steel railroad bridge dating to 1912 (the steel bridge was preceded by a wooden one).(4)

LOCAL PRESSURE FOR A BRIDGE

With the exception of those who walked across the railroad bridge, the only way across the river was by ferry or fording. This was an inconvenience (especially for farmers with produce) to get to Kensett, a town only four miles away, but on the opposite side of the river. By 1915, the townspeople were anxious for a highway bridge.(5)

The local newspaper, the Judsonia Weekly Advance, reported that Senator Davenport had pushed a bill through in the Senate in February 1915, and Representative Miller was working on the House. The legislation was necessary since the Little Red qualified as a navigable stream.(6) The bill was eventually successful and notice of a bridge letting was made public in August 1916. The notice indicated that bridge commissioners Judge John A. Marsh, J.S. Ladd, and G.M. Walters had specified a steel draw bridge to conform to the plans that could be found at the county clerk's office in Searcy, Arkansas, the county seat.(7) The choice of a swing span was probably based on the simple economic factor that "for unimportant crossings, a hand operated shear-pole swing bridge is the cheapest of all types."(8)

LOCAL POLITICS

On September 25, 1916, six companies presented bids for the contract. The low bid of \$32,990 fell to the Virginia Bridge and Iron Company of Memphis. As it turned out, this was the start of some political and legal wrangling. The county judge, who was a minority on the bridge commission but master of the purse strings, was opposed to the bid. Despite the other two commissioners' support for the bid, the judge was adamant in his refusal to sign the contract.(9) A newspaper article of a few days later that was announcing a public meeting about the bridge,

suggested there may have been personal conflicts holding up the project: "Now is the time for the people to show what interest they have in the bridge. All must work together harmoniously and drop all selfish interests if the bridge is to be secured."(10) This October 6th meeting drew a supportive crowd and even raised pledges for a part of the financial backing.(11)

The meeting was all for nought, however, as Chancery Court Judge John Martineau of Little Rock ruled

". . .that the commissioners had no power to let a contract without the complete approval of the county judge, that the judge was the fiscal agent of the county. . . .[T]he County Judge could build a bridge without the consent of the other commissioners but that the commissioners could not operate without the consent of the county judge."(12)

That was the end of the bridge--for the moment.

CONSTRUCTION

A few years later--partly, perhaps, because Judge Marsh was no longer in office and partly from the cessation of the ferry in 1921--a second attempt was made at getting a contract.(13) Judge F.O. White and fellow bridge commissioners J.S. Ladd, A. Neelly, and P.A. Billingsley chose a bid from Rexford L. Gaster, a road contractor from Little Rock who did regional construction work.(14) His \$45,000 offer won out over the \$46,000 of Judsonia's J.S. Kelley. In the latter half of August 1923 construction of the bridge under the supervision of R.M. Travis was finally begun. A newspaper article reported: "From a time whence man's memory runneth not to the contrary a bridge across the river has been one of the chief desires of the people of this community."(15)

On January 25, 1924, the bridge commissioners were formally presented with the new

bridge. At this point, the bridge consisted solely of the "steel work." Gaster perhaps ordered out for the bridge since, according to imprints on the bridge beams, at least three different steel manufacturers (Inland, Illinois, and Lackawanna) were involved, but no records were found on this topic. Neither of the approaches had been included in the contract with the R.L. Gaster Construction Company, so, having waited so long for a bridge, the townspeople pitched together to build the approaches. The approach on the southern bank opposite the town was contracted out to a local man, Oscar Stevens, using donated money, but the approach on the northern side was truly a community project.(16) Bridge commissioner and local retired Ford agent J.S. Ladd donated the fill located three blocks from the bridge(17): "More than one hundred men and two dozen teams made 1500 trips" over that three block course. It was a two-day project and those who could not donate time donated money. The women of the town provided a meal on the bridge in the midst of construction.(18)

Known in town as the "wagon bridge" (to distinguish it from the neighboring railroad bridge), the highway bridge became a focal point--at least for some in town. A local man was employed to turn the bridge. At the sound of a boat whistle, he would hustle down to the bridge and manually turn it by means of a lever over the center pier. The turner of the bridge was not the only one who listened for the boat whistle: it was considered an honor among the younger generation to actually ride on the bridge as it turned.(19)

According to Judsonia historian W.E. Orr, the most frequent reason to turn the bridge was to allow through a barge hauling rock from the Bee Rock quarry a few miles upstream. However, in the late 1920s, the quarrying business dropped off and the main reason to turn the bridge ceased; it is likely that the 1920s were the only years of operating the turn mechanism.(20) Today, the

swing span is welded to the approach spans and there are continuous pipes lying along the whole length of the deck, rendering turning impossible.

After its completion in 1924, the bridge formed a link in a newly constructed county road.(21) In a way, the bridge was both a beginning and an end for Judsonia: as part of the larger trend toward improved highways, the town had easier access to outlying areas; then trucking started to replace the railroad as the distributor of Judsonia's strawberries and, although Judsonia did become a trucking center for a while, this change in transport patterns merely contributed to the decline of strawberry farming. Whereas railroads had formed a cohesive advertising and distributing mechanism, trucking's dispersiveness seemed to inhibit an effective marketing program despite the efforts of local growers' associations.(22)

The bridge's life has not been an easy one. On top of six-plus decades of ordinary wear and tear, the structure survived the flood of 1927 that submerged a good portion of Arkansas,(23) and a 1952 tornado that leveled everything in Judsonia except the highway and railroad bridges.(24) Currently, the Judsonia bridge continues in its capacity as a county highway bridge.

ENGINEERING DESCRIPTION

The Judsonia Bridge is a single-lane, three-span bridge of 397-foot length, comprised of two approach spans of 49 and 79 feet, and a center bearing swing span of 266-foot length. The twelve-panel swing span provides two channels approximately 125 feet wide for river traffic if the bridge is opened. All three Warren trusses have riveted connections throughout. The members of all three trusses are built-up from channels, angles, batten plates, continuous plates, or lacing bars riveted together. The vertical and diagonal web members of the five panel through north approach span are

two channels, flanges outward, with double lacing on either side. The two diagonals in the center panel are two angles joined by lacing. The top chord is similar to the verticals except that a continuous plate replaces one side of lacing. The bottom chord is two angles with the horizontal legs facing inward and riveted to batten plates. Diagonal rods and struts laterally brace the top chords.

The south pony approach, with six panels, is shorter than the north approach, but has identical top and bottom chord sections. The web members are two angles with flanges inward, connected by batten plates. The two verticals, placed at the second panel point from each end, are like the web members except that they have four angles. The top chord of the swing span is constructed with two-inch-deep channel sections, flanges turned out, riveted to a continuous plate on top and lacing on the bottom. This chord is flat at a height of 22 feet, but reduced in size to four angles with batten plates at the center two panels, the chord slopes degrees to a peak 36 feet over the pivot. This increased height helps the span to act like a cantilever on either side of the pivot when the bridge is opened. The center vertical member and the web members radiating from the bottom chord at this panel point are similar in section to the top chord, but larger in size to carry the extra load when the bridge is opened. The vertical and web members from the peak out to the ends are one of three different sections: four angles with batten plates 4 inches on center, 10-inch-deep channel sections with double lacing, or one-inch channel sections with lacing. The sections decrease in cross-sectional area toward the ends of the span where less force is carried. The bottom chord is composed of 7- to 8-inch-deep channels with double lacing. The channels deepen at the center four panels where extra strength is needed to support the open bridge.

A three panel double intersection Warren truss made from angles acts as the portal bracing in the swing span. A similar lateral brace is on the web members at the center pivot. The upper

half of the space between the center vertical members is braced by crossed channel and plate sections, riveted to a square plate at the intersection. Double angles connect the upper end of each panel point and are themselves braced against the vertical members. Crossed rods between the top chords complete the lateral bracing.

The handrail and floor system for the swing span and approaches is the same. The handrail consists of two horizontally placed channels, spaced two feet apart, bolted to the web members. A cylindrical spacer on each web member keeps the rails at a constant distance. The floor system of all three trusses consists of I-beam girders at each panel point, with eight I-beam stringers connecting to the girders. Long nails were used to weld the stringer joints for a continuum the length of the span. Timber planks form the fourteen foot wide deck, with five planks running longitudinally along each tire path. Angles crossing beneath the floor at each panel point laterally brace the lower chords.

Additional girders are present at the center pier to strengthen the bridge when opened. These girders, similar to the bottom chord, are laid in two Y-shaped geometries. The base of the Y extends from the edge of the pier to the first floor girder. The base also extends into the cup of the Y, bisecting the cup. Two composite I-beams, made from steel angles and plates, close the cup of the Y, forming the central panel point of the span. The center-bearing pivot, surrounded by the composite girders, is made of steel. Eight wheels rotate on a flat steel track on the top of the center pier to balance the bridge as it turns. The bridge was turned by one man operating an unknown type of handle that keyed into a shaft accessible through a hole near the center of the floor deck. This first shaft was short and operated a small gear, less than one foot in diameter. This gear engaged a larger gear, of three foot diameter. A shaft from the second gear transmitted the torque down to

another small gear on a gear track on the top of the pier. This track travels quarter way around the pier and allowed the bridge to swing 90 degrees counter-clockwise. The combination of the two small gears and one large decreased the number of turns the operator had to make to open and close the bridge. Before the bridge was turned, the operator released a spring latch at either end of the span with a pulley at the center pier. Steel wheels at the edge of each end of the turn span move the bridge smoothly along the pier. A steel ramp directs the moving wheel back onto a concrete pad when the bridge is closed. The concrete piers have shelves where the wheels rest, and at a higher level the bearings of the approach spans sit. The bridge is no longer operable because the original deck has been replaced and the key removed.

ENDNOTES

1. Interview by Kathryn Steen (HAER), W.E. Orr (Judsonia historian), June 22, 1988.
2. Diana Sherwood, "Arkansas Baptist Colony, 1870," Arkansas Gazette, Vol. 122, No. 243 (July 20, 1941), Sunday Magazine Section, p. 2.
3. Elouise Scott, "Railroads and Strawberries," White County Heritage, Vol. XIX (1981), pp. 24, 26.
4. Scott, p. 35.
5. Orr interview, June 22, 1988.
6. "Bill for Bridge has passed Senate," Judsonia Weekly Advance, Vol. 37, No. 32 (February 10, 1915), p. 1.
7. "Notice," Judsonia Weekly Advance, Vol. 39, No. 4 (August 23, 1916), p. 5.
8. Otis Ellis Hovey, Movable Bridges (New York: John Wiley & Sons, Inc., 1926), p. 22.
9. "Awarding of Bridge Contract Delayed," Judsonia Weekly Advance, Vol. 39, No. 8 (September 27, 1916), p. 1.
10. "Bridge Meeting Next Friday Night," Judsonia Weekly Advance, Vol. 39, No. 9 (October 4, 1916), p. 1.
11. "Bridge Meeting a Big Success," Judsonia Weekly Advance, Vol. 39, No. 10 (October 11, 1916), p. 1.
12. "Bridge Injunction was Sustained," Judsonia Weekly Advance, Vol. 39, No. 11 (October 18, 1916), p. 1.
13. W.E. Orr, Comments (taken by Steve Mitchell), Heritage Tour, White County Historical Society (May 15, 1988), Judsonia, Arkansas.
14. "R.L. Gaster, Road Contractor, is Dead in Minnesota," Arkansas Gazette, Vol. 108, No. 287 (September 6, 1927), p. 8.
15. "Work Started on Judsonia Bridge," White County Record (August 23, 1923), p. 1.

16. "Judsonia Bridge is Completed, "White County Record (January 31, 1924), p. 1.
17. Centennial History of Arkansas, Vol. I. Chicago: The S. J. Clarke Publishing Company, 1922), pp. 196-7.
18. W.E. Orr, That's Judsonia (Judsonia: White County Printing Company, 1957), p. 161.
: "Judsonia Bridge Is Completed, "White County Record (February 7, 1924),p. 1.
19. Orr interview, June 22, 1988.
20. Orr interview, June 22, 1988.
21. "Locating Bridge, "Judsonia Weekly Advance (April 13, 1922), p. 1.
22. Scott, p. 35.: Orr interview, June 22, 1988.
23. "State Incurs Huge Loss in Wake of Record Flood, "White County Record, Vol. 5, No. 47 (April 28, 1927), p. 6.
24. Orr interview, June 22, 1988.

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- "Bill for Bridge has passed Senate." Judsonia Weekly Advance. Vol. 37, No. 32 (February 10, 1915), p. 1.
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- "Bridge Meeting a Big Success." Judsonia Weekly Advance. Vol.39, No. 9 (October 11, 1916), p.1.
- "Bridge Meeting Next Friday Night." Judsonia Weekly Advance. Vol. 39, No. 9 (October 4, 1916), p. 1.
- Centennial History of Arkansas, Vol. II. Chicago: The S.J. Clarke Publishing Company, 1922.
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- "Work Started on Judsonia Bridge." White County Record (August 23, 1923), p. 1