

**HISTORIC AMERICAN ENGINEERING RECORD**

**BLACK RIVER BRIDGE**

**HAER NO. AR-8**

**LOCATION:** Spanning the Black River at Pocahontas on US Highway 67 in Randolph County, Arkansas.

**UTM:** 15/4013830/682420

**QUAD:** Pocahontas, Arkansas

**DATE OF CONSTRUCTION:** 1934

**ENGINEER:** Arkansas State Highway and Transportation Department.

**PRESENT USE:** Vehicular bridge

**SIGNIFICANCE:** Erected in 1934, after extensive administrative complication, by the Pittsburgh-Des Moines Steel Company, the Black River Bridge at Pocahontas is significant as a swing bridge, one of three in the state. Similar in design to the bridge over the St. Francis River at Madison (HAER NO. AR-20), both having been designed to allow the passage of river traffic, the bridge at Pocahontas differs from the Madison Bridge largely in the details of its trusses.

**HISTORIAN:** Sean O'Reilly

**DESCRIPTION:** Corinne Smith

Arkansas Historic Bridge Recording Project, 1988

## POCAHONTAS

The rise of Pocahontas, county seat of Randolph County in northwest Arkansas, was intimately linked to the Black River which flowed by beside the town. Pocahontas, first settled in 1815 and then known as Bettis Bluff, became by 1838 "one of the most flourishing towns in the state."<sup>(1)</sup> Its rapid development was founded on its trading site on the Black River. The river formed the primary trade route in the area and was a solid economic foundation for the development of the town. "The river traffic was the nucleus of all commerce in the village of Pocahontas. Transportation in and out of the town and county was principally by steamboats on the Black River."<sup>(2)</sup>

In the later nineteenth century Pocahontas was approached by two railroad companies in succession, the Iron Mountain Railroad and the Frisco Railroad, each attempting to bring the railroad to Pocahontas. However, the landowners who had formed their wealth from the Black River, felt threatened by this unknown competitor. Remaining staunch in the belief that the river would maintain its significance and relevance in the new railroad era, they raised the price of land and the railroads by-passed the town. The surveyors then sent the railroad through nearby Walnut Ridge and Hoxie. "When the river declined in importance those who opposed the railroad saw their mistakes, but the town's decline was already under way and the railroads had been built elsewhere."<sup>(3)</sup> It was not until 1896 that the railroad came to Pocahontas, via a spur from Walnut Ridge. However, by that date new developments in transportation were about to commence.

While "it was close devotion to the river that led to the town's economic downfall," it was through the development of road transportation in the county that Pocahontas regained its earlier significance.<sup>(4)</sup> As the railroad had superseded the river, so the road was to succeed the railroad.

With the development through Pocahontas of Highway 67, "the Great Lakes to Gulf Highway," its citizens could greet the towns reinstatement on a major route. The Pocahontas section of Highway 67, was opened in February of 1931 by Dwight H. Blackwood, "broad shouldered and handsome as a Greek god", then Chairman of the State Highway Commission.(5) With an important interstate route passing through the town, a route whose significance was emphasized by the presence of Blackwood himself, a suitable bridge over the river was needed. While it was intended that the work on the bridge should immediately succeed the completion of the highway, administrative complications made this impossible.

#### THE POCAHONTAS STAR HERALD

Despite the enormous significance of the building of the new bridge over the Black River, the reports of the local and county newspaper, the Pocahontas Star Herald, were very rare. The significance to the town was acknowledged in the Herald only in its Goodwill Edition of August, 1932, where it stated:

Traffic through Pocahontas via highway has been handicapped in the past by the lack of an adequate bridge across the Black River on Highway 67 here...With the opening of the splendid new bridge here...this handicap should be removed and both freight traffic and passenger traffic to and through Pocahontas should show a marked increase.(6)

Apart from this case, the Pocahontas Star Herald gave only intermittent reference to the building of the bridge. Consequently, the primary source of information on the complex history of the Black River bridge is in the files of Arkansas' State Highway Department.

### BRIDGING THE BLACK RIVER

The bridge at Pocahontas spanned the Black River, a river that was considered navigable. To ensure that the passage of river traffic was not impaired by the bridge or its construction, Federal approval was required prior to its erection.(7) This process of approval had two stages, Congressional and Departmental. The projected bridge first required the passing of an Act in Congress legalizing the construction of the bridge. Once Congressional approval was received the bridge had to be commenced within one year and completed within three years of the passing of that act, provided no dates were specified. The legislation approving the bridge remained subject to the further approval of the War Department and the Chief of Engineers. In the complex and often chaotic search for approval for the Black River bridge, the Arkansas State Highway Department of the 1930s displayed both its weaknesses: disorganization and uncertainty; and its strengths: perseverance and dedication.

### CONGRESSIONAL APPROVAL I

The first stage in the process of seeking approval for a new bridge over the Black River was taken by Dwight H. Blackwood, Chairman of the State Highway Commission, in December 1929. In a letter to Pearl P. Oldfield, representative for Arkansas in Washington, Blackwood stated that "preliminary plans are being prepared for the Highway Commission for a new bridge over the Black River...to replace the present bridge at that point."(8) Blackwood requested that Oldfield have an act passed through Congress "Authorizing the Arkansas State Highway Commission to construct a free highway bridge across Black River, Pocahontas..."(9)

Pearl Oldfield, a Democrat elected in January 1929 to fill the vacancy left by her husband,

William Oldfield, was enthusiastic.(10) By February 1930, the bill was passed by the House of Representatives and on February 17 she sent a telegram to Blackwood saying "House Passed Today Pocahontas Bill."(11) On April 12, 1930, Congress passed Public No. 119,

...an act granting the consent of Congress to the Arkansas State Highway Commission to construct, maintain and operate a free highway bridge over the Black River at or near Pocahontas, Arkansas.(12)

This concluded the first stage of the Commissions work on the projected bridge. However, the efforts of Oldfield regarding the act remained fruitless. On January 10, 1931, Blackwood wrote to Oldfield once again, asking her to introduce a Bill in Congress which would grant permission to the Highway Department to "replace the old bridge across the Black River at Pocahontas..."(13)

#### CONGRESSIONAL APPROVAL II

It will soon be necessary to replace the old bridge across Black River...at this point considered navigable by the War Department...We would therefore greatly appreciate you introducing in Congress a Bill covering the necessary provisions.(14)

Thus wrote Blackwood to Oldfield on January 10, 1931, less than a year after the congressional approval for which he was asking had already been granted. Blackwood, "through an oversight" had "...overlooked the fact that (Oldfield) had already secured such an act..."(15) Oldfield, of course, realized the problem and on January 16 replied to Blackwood in a telegram that the act had already been secured and that "if you (Blackwood) are able commence construction in preliminary way on or before April twelfth will be unnecessary secure extension in time."(16) The "extension in time" referred to in the telegram alluded to a legal problem which arose from Blackwood's oversight. This problem was that the construction of the bridge was required to

commence within one year of receipt of congressional approval.(17) That year was to close on April 12, 1931.

However, commencement of the bridge before the required date was not possible.(18) Oldfield was then required to introduce a new Bill allowing "that the times for commencing and completing the construction of a bridge across the Black River...be extended one and three years respectively"(19)

On February 21, 1931, this new Bill was passed in the House of Representatives as H.R. 16337. However, it had not passed the Senate "at the time the Session adjourned."(20) Consequently, a complete new application to Congress was required before the construction of the bridge at Pocahontas could be legalized.

### CONGRESSIONAL APPROVAL III

The failure to secure an extension of the construction period for the Black River Bridge necessitated a re-application to Congress for new legislation. The Highway Commission made its re-application in the 72nd Congress. However, Pearl Oldfield, in March 1931, had been succeeded by John E. Miller. Miller, Democrat and, later, Senator, was the person who secured the final Congressional approval for the construction of the Black River bridge.

Dwight H. Blackwood wrote to Miller on February 10, 1932 to enlist his aid in securing the required approval.(21) Miller agreed and began immediate preparation of a bill, modeled on Oldfield's, asking for an extension "of the time for commencing and completing the construction" of the Black River bridge.(22) On Monday, April 4, the bill passed the House of Representatives as H.R. 9301.(23) Miller's bill was passed by Congress on April 22, 1932, two years and ten days

after the initial congressional approval was received.

#### WAR DEPARTMENT APPROVAL I

The earliest application for War Department approval on record dates from July 14, 1931, three months after the time limit, on the first congressional act, for commencing the bridge work had lapsed.(24) State Highway Department bridge engineer, N.B. Garver, forwarded the relevant information on the bridge to the War Department. This information included basic plans, sections, and elevations of the proposed bridge. The outline specifications needed to show that the bridge, as proposed, did not obstruct river traffic.

The War Department refused to approve the bridge "since the Act of Congress authorizing the work has expired."(25) However, it did acknowledge that, provided the bridge remained unchanged, "if you desire to proceed with the construction the Department will take no steps to prevent the work...."(26) The letter went on to remind the State Highway Department that, despite the War Department declaration not to object to proceeding with the construction "you are further informed that the new bridge will be an unlawful structure until legalized by an Act of Congress."(27)

In accordance with legislative requirements and despite the refusal of the War Department to approve the bridge, a first public hearing on the proposed bridge was scheduled for August 18, 1931, in Memphis, Tennessee.(28) The Pocahontas Star Herald did not report on the hearing. Why a public hearing on a bridge as yet unapproved should be held by the War Department is uncertain; it was probably to ensure a speedy approval once Congressional legislation had been enacted. It also allowed the War Department to have its obligatory hearing completed should the Highway

Department elect to proceed with the erection of the bridge.

### WAR DEPARTMENT APPROVAL II

Despite the War Department's policy of "non-objection", the Highway Department did not proceed with the construction of the bridge. It awaited the requisite legislative approval from Congress. As noted above, that approval was received on April 22, 1932. With congressional approval the Department could successfully apply to the War Department for official approval.

Unfortunately, further difficulties arose regarding the War Department's approval of the proposed bridge. In reply to a query from the Highway Department, the War Department requested a complete new application regarding the Black River bridge specifications.(29) As work did not start on the bridge prior to congressional approval, the War Department recommended that "the commission should now refile a complete new application under the Act."(30)

A second application was made and a second public hearing was scheduled for Tuesday, October 4, again in Memphis. The hearing was successful and on October 28 the State Highway Department received final approval from the War Department and could then legally commence work on the new Black River Bridge.(31)

### BRIDGE DESIGN AND COMPLETION

Designs for the bridge at Pocahontas were completed by September 1931.(32) The projected bridge was a steel swing bridge, where the central span of three rotated to permit the passage of river traffic. Its design was a standardized version of the Highway Department.(33) Due to unspecified delays the contract was not let until 1933, a year in which there was, apparently, no congressional



act passed legalizing the construction of the bridge.(34)

Bids for the bridge were opened at 10 a.m. on September 8, 1933, with nine construction companies participating in the bidding.(35) The successful bid was entered by the Pittsburgh-Des Moines Steel Company of 9 Tuttle Street, Des Moines, Iowa; at \$176,233.17 it was the lowest of the nine entered. Work on the bridge commenced that fall but no documentation of its progress remains on record.

Completed in 1934, the bridge was opened on November 27 with a speech by the Attorney General of Arkansas, The Honorable W. L. Pope. Pope recognized the importance of the bridge to the town in his speech, stating that:

Today this community takes its place among the favored ones of the nation advantageously located on a trunk highway that traverses the continent, the longest highway in the world.(36)

### LATER DEVELOPMENTS

In 1986 a new two-lane, 1253-foot-long bridge was completed, situated adjacent to the old swing bridge.(37) The new bridge permitted four lanes of traffic to cross the river, preserving the structure, if not the view, of the old bridge. "Randolph County residents gathered at the west end of the new Highway 67 Black River Bridge in Pocahontas September 24 (1986) to celebrate the completion of the long awaited \$2.6 million dollar project."(38) The irony was that, despite the problems encountered by the Highway Department from legislation designed to ensure the free navigation of river traffic, the new bridge obstructed that navigation. The passage of river traffic on the Black River finally became irrelevant.

PITTSBURGH-DES MOINES STEEL COMPANY

The Pittsburgh-Des Moines Steel Company began on March 5, 1900, when two engineers, William H. Jackson and Berkeley M. Moss, joined with Edward W. Crellin, owner of a steel fabricating shop in Tuttle Street, Des Moines, Iowa.(39) Together they formed the Des Moines Bridge and Iron Works and the Des Moines Bridge and Iron Company.

The founders of the new company were already experienced in their own fields. Jackson, a civil engineering graduate of Iowa State College, had joined with his former classmate Berkeley Moss to form the company Jackson and Moss, Engineers and Contractors. They quickly proved their engineering capabilities, specializing in the erection of water towers. Through their association with Edward Crellin they could expand their interests and, by 1901, the company was producing bridges, water systems, electric lighting plants, and general street improvements.

With profits consistently re-invested in the company, it grew rapidly. By 1907 the company was able to expand its offices to Pittsburgh, Pennsylvania. This city was the major source of steel in the United States, and controlled the price of steel throughout the nation. In 1910 the headquarters of the Des Moines Bridge and Iron Company were moved to Pittsburgh, securing its intimate association with the center of the steel industry. By 1915 the company was able to boast that, "being located at the principal source of (steel) supply enables us to make prompt shipments and to quote the very best prices on foreign and domestic business."(40)

Beginning in 1916, the company underwent a dramatic re-organization which resulted in its transformation into the Pittsburgh-Des Moines Steel Company in 1918. An almost continuous expansion was effected thereafter until the Depression of the 1930s.

In the early days the company specialized in bridge construction, with an impressive range

of bridge types: suspension, truss, arch, girder and I-beams. From the time of its incorporation as the Pittsburgh-Des Moines Steel Company it broadened its services to industry, frequently being employed as a sub-contractor. Bridge building, however, remained an important though subordinate part of the company's larger business.

### BRIDGE BUILDING OVER NAVIGABLE WATERS

J. Waddell, discussing the building of bridges over navigable waters stated:

The United States Government through the War Department has jurisdiction over all the navigable waters of the country, and has the right to dictate as to the character and location of all proposed bridges for crossing them....(41)

The bridging of navigable waters was a matter of great importance when waterways formed the major transportation routes in the country. The free passage of river traffic needed to be preserved at all times to ensure the protection of an essential trade route. By the 1930s the significance of navigable waters was much reduced, first by the railroads and then by the newly constructed roads. Congress, however, still retained its authority to approve or reject any proposal for the erection of a bridge over navigable waters.(42)

To ensure the non-obstructive erection, siting and structure of a bridge over navigable waters, the authority of Congress was supplemented and qualified by that of the War Department and the Chief of Engineers. In an act passed by Congress on March 23, 1906, entitled "An Act to regulate the construction of bridges over navigable waters," it was deemed that:

...when, hereafter, authority is granted by Congress to any persons to construct and maintain a bridge across or over any of the navigable waters of the United States such bridge shall not be built or commenced until the plans and specifications for its construction,

together with such drawings of the proposed construction and such maps of the proposed location as may be required for a full understanding of the subject have been submitted to the Secretary of War and the Chief of Engineers for their approval, nor until they shall have approved such plans and specifications and the location of such bridge and accessory works.(43)

Thus, while Congress may approve a bridge over navigable waters, that approval was subject to the further approval of the War Department and the Chief of Engineers. The latter, however, could not give any approval without the prior legislation on the bridge having been passed through Congress.

To ensure that the river remained navigable during construction it was further enacted that "...no bridge...shall at any time unreasonably obstruct the free navigation of the waters over which it is constructed."(44)

Time limits were also placed on the construction and completion of the bridge construction, Section 6 of the 1906 Act Provided that:

Whenever Congress shall...authorize the construction of any bridge . . . across . . . navigable waters . . . and no time for the commencement and completion of such bridge is named in said Act, the authority thereby granted shall...be null and void unless the actual construction of the bridge...be commenced within one year and completed within three years from the date of the passage of such act.(45)

Consequently any bridge whose commencement or completion was delayed beyond the stipulated one and three years had to receive new congressional legislation to legalize its construction.

In summary, a person intending to erect a bridge over a navigable water must first receive congressional approval, succeeded by and subject to the approval of the War Department and the Chief of Engineers, the task of the latter being to preserve the navigation of the river. Unless otherwise stipulated, the bridge must be commenced within one year of the passing of the relevant

act, and completed within three years of that date. If these temporal restrictions were not complied with, a new application had to be made to Congress.

By the early part of this century, permission to build a bridge over navigable water was largely routine, provided navigation remained unobstructed. Waddell noted that "...under ordinary conditions there is no difficulty experienced in obtaining the approval of the War Department to the plan and location of a proposed bridge..." and that "the army engineers endeavor to make it as easy as possible to get (the applicants') plans approved." (46) The act essentially preserved the right of the Federal authorities to veto any bridge that might obstruct the water ways, a right largely made redundant by the development of roads. However, especially during the Depression of the 1930s when bridge financing was slow and irregular, the Act of Congress of 1906 caused many complications for those involved in the erection of bridges over navigable waters.

#### ENGINEERING DESCRIPTION

The Black River Bridge is a three-span steel bridge of 1255 foot length, comprised of two 130-foot Parker trusses, a 230-foot Warren truss swing span, and 764 feet of concrete pile trestle approaches. The eastern approach is 577 feet long. When the center swing span is opened, two channels about 100 feet wide are provided for river traffic. The twelve panel swing span has verticals and a polygonal top chord. The seven-panel fixed spans have two diagonal braces in the center panels. All three spans have horizontal sub-struts at mid-panel height, as seen in the plan drawings.

The members in these three spans are built-up from channels, angles, batten plates, continuous plates, or lacing bars riveted together. All members are rigidly connected to each other

with rivets. The bottom chord is made of two channels connected by single lacing on two sides. The bottom chord of the swing span is constructed with a camber so that the ends are one half inch below grade when the span is open. The top chord, made of two channels with a continuous top plate and lacing bars, reaches a maximum height of 32 feet in the swing span and 24 feet in the other two. The vertical and web members are I-sections with the web oriented transverse to the longitudinal direction of the bridge. The web members in the center four panels of the swing span are two channels with lacing on either side.

The floor system and lateral bracing are essentially the same for the two types of span. Ten I-beam stringers run longitudinally, connecting to 20-inch-deep I-beam girders at each panel point. The original floor deck, laminated timber with asphalt planks, has been replaced with a concrete slab deck and a steel mesh, maintaining the 24-foot clear road width. Lateral bracing is achieved in three ways. Two angles laced together span panel points diagonally between the top chords of the trusses, and double angles laterally brace the floor. Sway bracing is formed at each panel point by 3-foot-deep, double-intersection Warren trusses.

The handrailing consists of channels, about 6 inches deep, riveted to posts and verticals. A 9-foot-long steel tool box is riveted to the hand railing on one side of the turn mechanism. The steel traffic gates at either end of the swing span double as hand railing when the bridge serves vehicular traffic.

The center two panels of the swing span are supported on the center-bearing pivot made of cast steel and phosphor-bronze and hardened tool steel discs. The four balance wheels revolve on a 24-foot diameter reinforced concrete pier. The swing span was turned by two men operating a 6-foot hickory handle that keyed into a shaft 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 3-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 a quarter-way around the pier and allowed the bridge to swing ninety degrees 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 four wedges at the ends, two wedges at the center, and latches at the ends of the span with a captain's wheel near the hickory handle. The wedges directed the bridge back into place when it was closed, so manganese-bronze was applied to the sliding faces of the wedges to decrease friction between the moving parts. The latches held the bridge closed.

ENDNOTES

1. Dalton L. "Pocahontas" in History of Towns and Communities in Randolph County, No page number.
2. "Growing Pains" in Pocahontas Centennial Randolph County, 1856-1956, No page number.
3. Adams, W. Clarence, "Historic Pocahontas", Arkansas Gazette, September 25, 1938, p. 2.
4. *ibid.*
5. "State Highway 67 Formally Opened by Commissioner", Pocahontas Star Herald, February 12, 1931, p.1.
6. "Highways Bring Bond Between This and Other Towns", Pocahontas Star Herald, Goodwill Edition, August 2, 1934.
7. See below, "Bridge Building over Navigable Waters".
8. D. H. Blackwood, Chairman State Highway Commission, to P. P. Oldfield, Congressman, December 28(?), 1929. AHTD Microfilm Files.
9. *ibid.*
10. Oldfield, P. P. in Biographical Directory of the American Congress, 1774-1961", U.S. Government Printing, 1961.
11. Oldfield to Blackwood, February 17, 1930. AHTD Microfilm Files.
12. Public - 119 - 71st Congress. April 12, 1930.
13. Blackwood to Oldfield, January 10, 1930. AHTD Microfilm Files.
14. *ibid.*
15. *ibid.*
16. Oldfield to Blackwood, January 16, 1931. AHTD Microfilm Files.



17. See below "Bridge Building over Navigable Waters".
18. Blackwood to Oldfield, January 20, 1931. AHTD Microfilm Files.
19. H.R. 16337, February 21, 1931.
20. Blackwood to J. E. Miller, February 10, 1932. AHTD Microfilm Files.
21. *ibid.*
22. H.R. 9301, February 13, 1932.
23. *ibid.*
24. N.B. Garver, Bridge Engineer to U. S. War Department, July 14, 1931. Application form filed July 23, 1931. AHTD Microfilm Files.
25. Brehon Somerville, Major, Corps of Engineers, District Engineer, to Blackwood, September 16, 1931. AHTD Microfilm Files.
26. *ibid.*
27. *ibid.*
28. Notice of Public Hearing, issued by U. S. War Department, July 20, 1931. AHTD Microfilm Files.
29. Garver to War Department, August 19, 1932. Somerville to Garver, August 24, 1932. AHTD Microfilm Files.
30. Somerville to Garver, August 24, 1932. AHTD Microfilm Files.
31. Approval of Location and Plans of Bridge, issued by War Department, October 28, 1932. AHTD Microfilm Files.
32. Bridge 483 1/2. Card File, AHTD.
33. Historic American Engineering Record. HAER Report AR-20: "St. Francis River Bridge," 1988.
34. No act can be found, though an act of April 30, 1923, Public-No. 185-73d Congress, legalizes, "The Bridge now Being Constructed Across Black River at or near Pocahontas".

35. The list of these companies and their bids are on file in AHTD Microfilm Files.
36. "Hon. W. L. Pope gives Historical Facts at Bridge Opening", Pocahontas Star Herald, November 29, 1934, p. 1.
37. "Highway 67 Bridge at Pocahontas Dedicated", Arkansas Highways, Winter, 1986. p. 6.
38. *ibid.*
39. Versteeg, Jean D., The History of Pittsburgh-Des Moines Corporation, 1892-1981, Pittsburgh-Des Moines Corporation, 1981.
40. *ibid.*, p. 12.
41. "Requirements of the United States Government for Bridging Navigable Waters", in Waddell, J., Bridge Engineering, 1916, Vol. II, pp. 1137-1146.
42. *ibid.*
43. Quoted from Waddell, *loc.cit.* pp. 1138-1139.
44. *ibid.*
45. *ibid.*
46. *ibid.* pp. 1141 and 1142.

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