

## HISTORIC AMERICAN ENGINEERING RECORD

### NIMROD BRIDGE (Wallace Bridge)

HAER No. AR-66

**LOCATION:** Spanning Fourche Lafave River at Wallace Bridge Road (County Road 18), Nimrod vicinity, Perry County, Arkansas  
UTM: 15,494933.3865993, Nimrod, Arkansas Quad.

**AHTD #:** 15731

**STRUCTURAL TYPE:** Camelback through truss

**DATE OF CONSTRUCTION:** 1908

**FABRICATOR:** Southwestern Bridge Company, Joplin, Missouri

**OWNER:** Perry County, Arkansas

**USE:** Vehicular bridge

**SIGNIFICANCE:** Nimrod Bridge is highly representative of the early twentieth century era of metal truss bridge technology and the period of Arkansas history that saw the development of county road systems, prior to the establishment of the Arkansas State Highway Department in 1913. It is one of only three surviving camelback truss bridges in Arkansas.

**HISTORIAN:** Researched and written by Lola Bennett, Summer 2005

**PROJECT INFORMATION:** The Arkansas Historic Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program that documents and interprets historically significant engineering sites and structures in the United States. HAER is administered by the Heritage Documentation Programs Division of the National Park Service, United States Department of the Interior. The Arkansas State Highway and Transportation Department cosponsored and funded this project.

## **Chronology**

- 1803 Louisiana Purchase
- 1808 Aaron Price settles on Fourche LaFave in present-day Perry County
- 1819 Arkansas Territory created
- 1836 Arkansas admitted to the Union
- 1840 Perry County established
- 1844 Thomas and Caleb Pratt patent Pratt truss
- 1850 Perry County population totals 984
- 1870 Charles H. Parker patents Parker truss
- 1871 Fourche post office established
- 1874 Fourche post office name changed to Nimrod
- 1875 Arkansas State Legislature authorizes counties to build and maintain bridges
- 1879 Nimrod appears on W.L. Nicholson's "Post Road Map of the State of Arkansas"
- 1892 National League for Good Roads founded
- 1900 Perry County population totals 7,294
- 1902 First bridge built across Fourche LaFave River near Perryville
- 1907 Arkansas Legislature authorizes Perry County to erect bridges on Fourche LaFave River
- 1908 Perry County erects metal truss bridges at Aplin, Houston, Nimrod and Casa
- 1910 Perry County population totals 9,402
- 2003 Nimrod (Wallace) Bridge listed on National Register of Historic Places
- 2005 Nimrod Bridge recorded by the Historic American Engineering Record

## Introduction

Bridges were rare in Arkansas until the late nineteenth century. Crossings over most rivers were by ford or ferry, both often unreliable and dangerous. Although wood and stone spans were built in some instances, there were few bridges in Arkansas until after the Civil War, by which time iron and steel truss bridges dominated American bridge building.

The rise of specialized bridge building firms in the 1860s and 1870s occurred in response to the rapid growth of American railroads and the concomitant demand for strong, economical, efficient railroad bridges. Iron manufactories specialized in the fabrication of standard truss bridge designs that could be shipped to the site by rail and erected quickly by local workmen. These companies found an eager market in town and county governments seeking strong and affordable bridges prefabricated iron bridges.

Nimrod Bridge is highly representative of the era of metal truss bridge technology, when standardized bridges and piers were mass-produced in fabrication shops, shipped by rail to sites throughout the country, and erected by local workmen.<sup>1</sup> Perry County had the bridge constructed in accordance with the *Acts of Arkansas* of 1875, which authorized counties to build and maintain bridges. It represents the period of Arkansas history that saw the development of county road systems, prior to the establishment of the Arkansas State Highway Commission. Nimrod Bridge is one of three surviving camelback truss bridges in Arkansas:

HAER AR-70	#17693	Ward's Crossing Bridge	Yell County	1905	160'	Converse Bridge Co.
HAER AR-44	#20103	Little Missouri River Bridge	Clark County	1908	177'	Southwestern Bridge Co.
HAER AR-66	#15731	Nimrod (Wallace) Bridge	Perry County	1908	180'	Southwestern Bridge Co.

## Description

Nimrod Bridge is a single-span, pin-connected camelback through truss bridge on concrete filled cylinder piers. The bridge has a 180' span and is 222' long overall, including a steel stringer approach span at each end. The trusses are spaced 17' apart, with a roadway width of 15'. The bridge is 26' high at center span and 17'-6" high at the portals. Clearance is 14'-2".

The ten-panel trusses have polygonal upper chords of five straight segments, including the inclined endposts. The upper chords and inclined endposts are riveted, built-up 8"x12" members, comprised of back- to-back channels connected by a solid plate on top and lacing bars underneath. The lower chords are paired 1¾"x ¾" forged eyebars. The upper and lower chords are connected by built-up 5"x6" posts and paired ½"x3" loop-ended tension bars angling up

<sup>1</sup> The Nimrod Bridge is commonly known as Wallace Bridge, named for Nimrod physician Dr. Charles T. Wallace, who lived next to the bridge and served on the bridge committee that organized its construction.

towards the ends. The four center panels have paired ¾" diameter tension rods with turnbuckles angling in both directions. The trusses are braced overhead with web panels, comprised of angles and gussets, at each panel point. The trusses are connected at the upper chord with 1½" diameter pins and at the lower chord with 2½" diameter pins. The pins pass through (from the outside) the lower lateral bracing, the eye of the lower chord, the eye of the diagonal rod, and the deck beam hangers. The pins are secured with a hex nut at each end.

The deck system consists of transverse steel deck beams, longitudinal wood stringers and a transverse wood deck. The 5¼"x12" steel deck beams are suspended below the lower chord by a metal extension riveted to the bottom of each vertical post. There are seven lines of 4"x9½" wood stringers on top of the deck beams. The wearing surface of the deck, which has many repairs, is 3" thick, with variable width wood planks laid transversely on the stringers.

Upper lateral sway bracing consists of 5/8"-diameter rods with threaded ends, which cross between panel points. Lower lateral bracing consists of 1"-diameter rods crossing between the deck beams and secured their ends with brackets and nuts. There is additional sway bracing over the portals. There is a steel railing on each side of the bridge.

## History

In 1902, the first bridge was constructed across the Fourche LaFave River near Perryville.<sup>2</sup> Three years later, the Perry County Court appointed County Judge J.N. Stone, Asa Wright and Dr. Charles T. Wallace commissioners for building a bridge across Fourche LaFave River in the western part of the county.<sup>3</sup> The Gill Ford Bridge was erected in 1906. The commissioners subsequently selected several additional bridge locations along the river, two of which were on navigable sections of the river, requiring approval of the Arkansas State Legislature.<sup>4</sup>

In 1907, the Perry County Court contracted with the Virginia Bridge & Iron Company of Roanoke, Virginia, for steel bridges to span the Fourche River at Fourche, Houston, Aplin and Nimrod. At an unknown point during construction, the company transferred the contracts to the Southwestern Bridge Company of Joplin, Missouri. The Nimrod Bridge was completed in 1908 at a cost of approximately \$10,000.

## Builder

Little is known about the Southwestern Bridge Company of Joplin, Missouri. The company may have been a subsidiary of Virginia Bridge & Iron Company, or a branch of the Southwestern Bridge & Culvert Company of Oklahoma City, although neither connection has been established. Photographs of the Southwestern Bridge Company plant from the 1907 American Mining

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<sup>2</sup> *Perry County, Arkansas: Its Land and People* (Perryville: Perry County Historical and Genealogical Society, 2004), 13.

<sup>3</sup> *Perry County Court Records*, 17 January 1906 (Book E), 96.

<sup>4</sup> *Acts of Arkansas*, 1907. Part of one of these bridges, a swing bridge, still survives near Bigelow.

Congress indicate that the company manufactured structural steel for buildings and bridges.<sup>5</sup> To date, the Southwestern Bridge Company has been associated with only one other bridge in Arkansas, the Nachitoch Bluff Bridge (1908) over Little Missouri River in Clark County.<sup>6</sup>

## Design

In 1844, railroad engineer Thomas Pratt and his father, Boston architect Caleb Pratt, received a patent for a wood and iron truss with vertical members in compression and diagonal members in tension. A reversal of the 1840 Howe truss, the Pratt truss shortened the compression members and reduced the danger of buckling. Developed at a time when railroads were placing new demands on bridges and the structural action of trusses was just beginning to be understood, the Pratt truss was one of several truss types that heralded the transformation from empirical to scientific bridge design. While the type was not immediately popular for wood spans, the Pratt truss came to be favored for its straightforward design, strength and adaptability, and by 1870, in a simplified all-metal version, it had become the standard American truss for moderate road and railroad spans, and remained so well into the twentieth century.

In the latter decades of the nineteenth century, engineers introduced a number of modifications to the standard Pratt truss, in order to use the configuration in a wider range of structures. One such modification was a polygonal upper chord, which increased the depth of the truss at the center of the span where the greatest bending moments occur, thereby permitting longer spans without substantially increasing the cost. As bridge engineer Charles H. Hoyt observed in 1911:

*The Pratt type of truss, more or less modified frequently in consequence of the varying depth of truss, is much used and makes an excellent style of bridges. It is adapted to almost any length of span from 100 feet up.*<sup>7</sup>

The most economical variation of the “curved chord” Pratt truss was the camelback truss, with a polygonal upper chord of exactly five slopes, the minimum number needed to achieve the benefits of the polygonal shape. The camelback truss was popular well into the twentieth century for spans of about 130’ to 200’.

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<sup>5</sup> *The World's Greatest Zinc and Lead District, as Seen Through the Camera* (Joplin, Missouri: 10th American Mining Congress, 1907).

<sup>6</sup> According to *Clark County Court Records*, Southwestern Bridge Company engineer John I. Boggs drew plans for the Little Missouri River Bridge in 1907. *Clark County Court Records*, Book J, 517.

<sup>7</sup> Charles H. Hoyt and William H. Burr, *Highway Bridges and Culverts* (Washington: U.S. Department of Agriculture, Office of Public Roads, 1911), 20.

**Appendix A: Field Photographs**



Elevation. Field photograph taken by Lola Bennett.

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