MISSOURI & NORTH ARKANSAS RAILROAD BRIDGE  
(Middle Fork Bridge)  
(Shirley Railroad Bridge)  
Arkansas Bridges 2005  
Spanning Middle Fork Little Red River  
Shirley  
Van Buren County  
Arkansas

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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

MISSOURI & NORTH ARKANSAS RAILROAD BRIDGE
(Middle Fork Bridge)
(Shirley Railroad Bridge)

HAER No. AR-76

Location: Spanning Middle Fork Little Red River at former Missouri & Northern Arkansas Railroad right-of-way (now part of River Road), Shirley, Van Buren County, Arkansas

UTM: 15.561334.3946385, Shirley, Arkansas Quad.

AHTD#: 20045

Structural Type: Baltimore through truss

Construction Date: 1908; rehabilitated 1978

Fabricator: Possibly Wisconsin Bridge & Iron Co., Milwaukee, Wisconsin

Owner: Van Buren County, Arkansas

Original Use: Railroad bridge

Present Use: Roadway bridge

Significance: The Missouri & North Arkansas Railroad Bridge at Shirley, Arkansas, is an example of a Baltimore through truss, a modification of the Pratt truss developed by the Pennsylvania Railroad in 1871. This structure is of interest as a former railroad bridge adapted for use as a roadway bridge.

Project Information: The Arkansas Historic Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program that documents 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, Richard O’Connor, Manager. The Arkansas State Highway and Transportation Department sponsored this project.

Lola Bennett, HAER Historian, 2007

According to James Fair’s 1969 book, The North Arkansas Line (p. 45), Wisconsin Bridge & Iron Company had the contract for all steel bridges between Harrison and Leslie. In 1907, they also replaced the original 1882 bridge at Beaver with the present Baltimore through truss (p. 73). No information has been found to confirm the fabricator of the bridge at Shirley, but a comparison of the two bridges might be useful.
Chronology

1803  Louisiana Purchase doubles size of the United States
1819  Arkansas Territory created from part of Louisiana Purchase
1833  Van Buren County formed
1836  Arkansas becomes 25th state to join the Union
1844  Pratt truss patented
1845  Richard Osborne erects America’s first iron railroad bridge at Manayunk, Pennsylvania
1855  First railroad built in Arkansas
1871  Baltimore truss introduced by the Pennsylvania Railroad
1882  Missouri & Arkansas Railroad chartered
1890  Van Buren County population 8,567
1906  Missouri & Arkansas Railroad reorganizes as Missouri & North Arkansas Railroad
1908  Missouri & North Arkansas Railroad Bridge erected
1909  Missouri & North Arkansas Railroad completed
1910  Town of “Sherley” appears on Arkansas Railroad Commission map
1911  Town of Shirley incorporated; population 350
1946  Missouri & North Arkansas Railroad abandons line
1978  Missouri & North Arkansas Railroad Bridge rehabilitated for use as a roadway bridge
Description

The Missouri & North Arkansas Railroad Bridge at Shirley, Arkansas, is a single-span, pin-connected Baltimore through truss on concrete piers. The 154' main span has six panels. There is a 56' steel stringer approach span at the north end and a 136' concrete T-beam approach span at the south end of the bridge. The overall length of the bridge, including approaches, is 340'. Overhead clearance is 20'.

The trusses are 26' high and spaced 16' apart. The members are all riveted, built-up sections with gusseted connections. The upper chords and inclined endposts are comprised of back-to-back channels connected by a solid plate on top and lacing underneath. The lower chords are paired I-bars in the center panels and angles connected with tie plates in the end panels. The upper and lower chords are connected by 8" x 12" posts and 13" x 16" diagonal braces. Counters are paired 2" x 7" loop-ended eyebars. Upper lateral sway bracing consists of paired angles with lacing crossing between panel points.

The 1' x 4' steel floor beams are comprised of plates and angles riveted together. The beams are suspended from the trusses by means of brackets attached to each post. There are five lines of steel stringers on top of the floor beams and transverse wood planks laid on the stringers. There is a continuous concrete wearing surface on top of the deck. The railroad tracks were removed from the structure sometime prior to 1978, when the bridge was rehabilitated for use as a roadway bridge.

History

In 1882, a group of St. Louis capitalists headed by Gen. Clayton Powell chartered the Missouri & Arkansas Railroad Company to build a railroad from Seligman, Missouri, to Eureka Springs, Arkansas. The railroad opened in February 1883 and was extended south to Leslie, Arkansas in 1903. In 1906, when the company reorganized as the Missouri & North Arkansas Railroad, plans were made to extend the line to Helena, on the Mississippi River.

Construction began in 1907, and the line was opened to travel in 1909. The route passed through the northeast corner of Van Buren County near the small hamlet of Settlement. At that location, contractors erected two steel truss railroad bridges over Middle Fork Little Red River. The bridges were completed sometime prior to June 15, 1908. Shortly thereafter, several residents of Settlement purchased 80 acres of land across the river near the depot and platted a village named "Shirley." Within two years, most of Settlement's businesses had moved across the river, and Shirley boasted 350 residents, a bank, post office, two sawmills, a grist mill, a dozen stores and a livery stable.

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2 Mountain Wave [Marshall, Arkansas], 26 June 1908, 2.
Despite its importance to the economy of the Ozark region, the Missouri & North Arkansas Railroad was plagued by accidents, floods, strikes and financial problems. The company ultimately declared bankruptcy and the line was abandoned in 1946. Thirty years later, Van Buren County rehabilitated the former railroad bridge at Shirley for use as a roadway bridge.

Design

From the mid-nineteenth century on, the growing demand for railroad bridges was a major impetus to the development of American bridge building technology. In the quest for longer, stronger bridges, railroad engineers advanced the science of structural analysis and the understanding of bridge design.

Civil engineer Thomas Willis Pratt (1812-1875) was born in Boston, where his father, Caleb Pratt, was a noted architect. After obtaining his secondary education in the public schools of Boston, he enrolled at the Rensselaer Academy (now Rensselaer Polytechnic Institute) in Troy, New York, where he studied architecture. After graduation, Pratt worked for the Army Corps of Engineers, building dry docks for the Navy Yards at Charleston, South Carolina, and Norfolk, Virginia. In 1833, Pratt was employed by the Boston & Maine Railroad, where he began designing bridges. The remainder of his career was devoted to engineering and supervising work for railroad lines in the Eastern United States.

During his career, Thomas Pratt patented several inventions, including a steam boiler and a method of ship hull construction. The patent he achieved notoriety for is a roof and bridge truss, patented in 1844. The Pratt truss reversed the configuration of the 1840 Howe truss, putting the shorter web members in compression and the longer web members in tension, which greatly reduced the chances of structural failure through buckling. Developed at a time when 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. Over time, the Pratt truss came to be favored for its strength and straightforward design; by the 1870s it was the standard American truss type for moderate railroad and highway spans and continued to be so well into the twentieth century.

Introduced by the Pennsylvania Railroad in 1871, the Baltimore truss is a Pratt truss with subdivided panels, a modification that increases rigidity in longer, deeper spans without significantly increasing the overall weight of the structure. The Baltimore truss was used for long-span railroad bridges well into the twentieth century.
Sources


“Arkansas Welcomes the World,” *Arkansas Gazette*, 1 March 1906.


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Jet Lowe, photographer, April 2008

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