Smith Road Bowstring Arch Bridge
Spanning Sycamore Creek at Smith Road (TR 62)
Lykens vicinity
Crawford County
Ohio

HAER No. OH-46

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record
National Park Service
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HISTORIC AMERICAN ENGINEERING RECORD

Smith Road Bowstring Arch Bridge
(Smith Road Bridge)

HAER No. OH-46

Location: 0.5 mile north of ate Route 100, Smith Road (a.k.a. Parks Road, ownship Route 62) over Sycamore Creek (Geiseman Ditch), Lykens Township, Crawford County, Ohio

UTM Coordinates: 17/328600/4532430

Date of Construction: ca. 1870 (probably relocated to this site in 1890)

Present Owner: County of Crawford
Board of Commissioners
Crawford County Courthouse
Bucyrus, Ohio

Present Use: Vehicular traffic

Significance: This is the oldest bridge in Crawford County, Ohio. It also provides a prime, existing example of a wrought iron tubular arch design, patented by Zenas King of Cleveland's King Iron Bridge and Manufacturing Company in 1861 and improved upon in 1867. The patenting and manufacturing of the prototype of this design, among the first in the United States for an iron bridge, launched the career of this bridge designer and builder. The bridge, listed on the National Register of Historic Places as the Smith Road Bridge, is scheduled to be replaced by 1991. Federal aid has been requested to fund the replacement.

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The Smith Road Bowstring Arch Bridge identified in some records as Bunker Hill Bridge, exemplifies the wrought iron tubular arch design patented by Zenas King in 1861 abd 1867. It has an overall span of 43 feet 6 inches, and a overall width of 15 feet. The bridge deck is approximately 2 feet above the bearing point, leading some experts to believe that the bridge was not built to suit this site but relocated, possihly in 1890, from another site. Through no evidence was found to justify the ca. 1870 date attached to the bridge, the character and detailing of the cast-and-wrought iron bridge members is indicative of bridges fabricated in the 1870's. By the 1890's, the bowstring arch design had been supplanted by more conventional Pratt, Warren and Parker trusses. Thus. the assumption that the bridge originally dates from the 1870's and was relocated to the present site in 1890.

The truss verticals are cast-iron members, cruciform in section, whose ends have been rounded and threaded through the top chord and connected by cast iron washers and nuts. This characterizes bridges patterned after Zenas King's patent. King intended his tubular arch bridges to be adjustable to adapt to varying loads.[1]

The upper chord of the bridge is a rectangular tubular arch made up of channels and plates rivited together. This rises to a height of 3 feet at its highest point above the deck and 4 feet 6 inches above the bottom chord. The bridge has five panels varying in length from 7 feet 6 inches to 9 feet 6 inches at the ends. "S" shaped brackets support a

railing at the ends of the arches. The bottom chord consist of two 3/4" x 3" iron bars whose ends have been forged to 1 3/4 inch diameter to fit through openings in the shoe and threaded to receive tightening nuts. These features also characterize King's tubular arch bridge patents.[2]

The first prototype of the wrought iron tubular arch bridge launched Zenas King into his highly successful bridge building business. King, a native of Vermont, first gained knowledge of iron manufacturing while working as a salesman for a Cincinnati agricultural machinery firm and, later, learned about bridge building as an agent for Mosley Bridge Company. While in Cincinnati, King met Peter M. Freez, a boiler maker, and formed a business partnership with him in 1858, to build arch and swing bridges. They received a patent for their wrought iron bridge in 1861. This initial bridge design was among the first in the united States for an iron bridge and lead to King's career as a manufacturer of iron bridges. They moved their business to Cleveland in 1862, and the partnership in their bridge and boiler business lasted until 1866. When the partnership dissolved, King retained the bridge manufacturing interests, and Freez kept the boiler making portion of the business.[3] As a result, King filed for a new patent for the wrought iron tubular arch bridge in order to verify his full rights to it and received the patent on July 30, 1867. Despite King's rights to the patent and the addition of the adjustable hangers to the 1867 patent, the plaque on the Smith Road Bowstring Arch Bridge credits both King and Freez for the bridge design.[4]

In 1871, his tubular arch and subsequent bridge innovations had given him enough success to incorporate his business as the King Iron Bridge and Manufacturing Company with a capital stock of $225,000. He and Freez had begun business in 1858 with an investment of only $5,000.[5] By 1876, King's sales reached $1 million as the result of his reputation for iron arch bridges.[6] As his career advanced, King expanded his manufacturing plant and the range of bridge designs, giving him a national reputation for iron bridges, (See Harrison Road Camelback Through Truss Bridge, HAER OH-49).

The Smith Road Bowstring Arch Bridge crosses a tributary of Sycamore Creek known as Geiseman Ditch. In 1881, the county surveyor widened and improved the natural channel of the stream, and the ditch was named for local property owner William Geiseman.[7] It seems logical that a bridge would have been built across the ditch when it was created. However, county records give no indication of a bridge at this site in 1881, and the county engineers records give 1890 as the date of construction for the present bridge. The possibility exists that the present bridge was actually built in 1881, and the engineers records give an estimated date of construction. Still, no contemporary records of the bridge's construction exist showing evidence of a bridge at the site in either the 1880s or 1890s. One may theorize that if the bridge was in fact relocated from another site, it was located at this site as an emergency replacement for a bridge built in 1881. Such an emergency relocation of a bridge to replace a destroyed one would not have

necessarily been accomplished by a contractor. If the county surveyor performed the work, no clear record would have necessarily been made by the board of commissioners of work at the site. If the present bridge was indeed an emergency replacement for a former bridge, that would explain the fact that the present bridge does not fit the road level and stream width. However, these theories bear no substantiation since there are no contemporary records for a bridge at the site in either 1881 or 1890. Likewise, no evidence exists of another wrought iron tubular arch bridge in Crawford County, and it seems too difficult and costly for the county government to import an ill-fitting bridge from another county to a comparatively insignificant stream crossing. Thus, this bridge's history poses a number of questions that might never be answered. Nevertheless, this prime example of a King wrought iron tubular arch hridge deserves note as a National Register of Historic Places property that is threatened by the advances of age and the resulting plans for its replacement.

NOTES

1 U. S., Department of Commerce, Office of Patents and Trademarks, Improvement in Bridges Patent Reissue No. 2,707 (1867).

2 Ibid.

3 Crisfield Johnson, comp., History of Cuyahoga County, Ohio (Cleveland: D. W. Ensign & Co., 1879), pp. 366-368.

4 U. S. Department of Commerce, Office of Patents and Trademarks, Improvement in Bridges.

5 Johnson, History of Cuyahoga County, p. 310.

6 William Ganson Rose, Cleveland: The Making of a City (Cleveland: World Publishing, 1950), p. 287.

7 Ohio County of Crawford, Office of the County Engineer, Crawford No. 10, Bridge Files.

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