

10. NAME(S) OF STRUCTURE

State Bridge Number 1

11. PHOTOS (W/ FILM ROLL & FRAME NO.) AND SKETCH MAP OF LOCATION

1B:9-29



1B:20A

- Mack, Warren W. "A History of Motor Highways in Delaware", in Reed, Henry Clay, Delaware: A History of the First State, vol.2, pp.535-550 (NY: Lewis Historical Publishing Co., 1947).
Delaware State Program. Delaware State Highways: The Story of Roads in Delaware... [Newark, Delaware: Press of Kells, 1919].
Federal Writers' Project. Delaware: A Guide to the First State. (New York: Viking Press, 1938).
The National Cyclopaedia of American Biography, vol.A (New York: James T. White & Company, 1930).
Spero, Paula A. C. Metal Truss Bridges in Virginia. ((Charlottesville, Virginia: Virginia Highway & Transportation Research Council, 1978-1981).
Wilmington Evening Journal Every Evening, 1 August 1934; 4 March 1937.

Hagley Library. New Castle County Engineer Quarterly Report Records.
Delaware State Archives. New Castle County Levy Court Records. Specifications, Proposals, Contract and Bond files.
Delaware State Archives. New Castle County Road Commissioners Records, 1750-1940.
Delaware State Archives. New Castle County Engineer Records, 1928.
Delaware DOT records: Photo archives; contract files.
Plans on file at Delaware DOT: Contract #BNC-89, 70-030-02, 78-061-05

13. INVENTORIED BY:

AFFILIATION

DATE

P.A.C. Spero & Company with Kidde Consultants for Delaware DOT

April-November 1988

HABS/HAER INVENTORY

See "HABS/HAER Inventory Guidelines" before filling out this card.

1. NAME(S) OF STRUCTURE

State Bridge Number 1

2. LOCATION

Rising Sun Lane over Brandywine Creek
Wilmington, New Castle County, Delaware

3. DATE(S) OF CONSTRUCTION

1928/79

4. USE (ORIGINAL/CURRENT)

Vehicular

5. RATING

MT

6. CONDITION

Good.

State Bridge Number 1 (Rising Sun Bridge) comprises a 123'-0" riveted Pratt through truss and a stone arch span for an overall length of 193'-6". The inclined end posts of the 6-panel truss consist of riveted channels with cover plates; the intermediate sway bracing posts and bottom chords are made of laced double angles, and the top chord consists of laced channels. Diagonals are made of angles with stay plates; lateral bracing consists of laced angles. There is a 5'-0" walkway cantilevered off the east elevation. The decorative metal railing has lattice below with scrolls and a pipe handrail above. The deck is supported on seven transverse girders spanned by three longitudinal I-beams. The truss is supported on uncoursed ashlar abutments with U-shaped rubble stone wing walls with decorative coping; incorporated within the south approach wall is a 25'-0" segmental arch span. The bridge carries two lanes of traffic on a 20'-0" roadway; the truss span measures 14'-0" high from the deck to the sway struts.

The Levy Court of New Castle County authorized the construction of the Rising Sun Bridge; A.P. Shaw served as County Engineer during the bridge construction. The bridge was constructed under contract number 28-2-5-4. New Castle County Engineer's Reports record that \$19,833.59 of the construction funds were derived from a Rural Bridge Bond Issue; the total cost, including preliminary surveys, advertising costs, engineering fees and construction amounted to \$23,985.80. A plaque on the south portal records the construction of the truss in 1928 by the Standard Engineering and Contracting Company of Middlesex, New Jersey, with consulting engineers Harrington, Howard, and Ash. This Kansas City, Missouri, engineering firm specialized in the design of movable bridges, and was responsible for several major structures in Delaware in the 1920s. John Lyle Harrington and Ernest E. Howard both began their bridge-building careers in association with J. A. L. Waddell, whose 1892 design for a vertical lift bridge at South Halstead Street in Chicago had established his eminence as a pioneer of the type. Harrington went to work in Waddell's office in Kansas City after graduating from the University of Kansas in 1895; he left to pursue further education and worked for a succession of bridge companies until 1907, when he returned to Kansas City to enter a consulting practice in partnership with Waddell. It was there that he met Howard, who had been working with the firm of Waddell and Hedrick since 1901 as draftsman, designer, and resident engineer. Upon the 1907 reorganization of the firm as Waddell and Harrington, Howard assumed the position of associate engineer. In 1914, Harrington, Howard, and Louis R. Ash formed Harrington, Howard & Ash which designed and constructed bridges until 1928. In Delaware, their work is exemplified by Bridges 393, a swing bridge crossing the Appoquinimink River at Odessa, constructed in 1928, and Bridge 688, a bascule span built in 1927 to carry South Market Street over the Christina River in Wilmington. Howard and Ash became associated with the firm of Ash, Howard, Needles and Tammen which produced the bascule bridge carrying North Church Street over the Brandywine in Wilmington (Bridge #577, built 1932). Both Harrington and Howard patented numerous improvements to movable bridges; both held offices in national professional organizations, and Howard contributed several articles to professional journals. Delaware Department of Transportation records state that Bridge No. 1 was built in 1928. The original Rising Sun bridge, constructed in 1883, was a timber covered bridge comprising a Burr truss spanning 124 feet and supported on massive granite abutments. The bridge measured 22 feet in width and functioned until 1927 when demolished for the construction of a new steel truss. That truss, the current bridge, utilized the existing abutments. The bridge was designed to support two 15-ton trucks with impact and opened to traffic in 1928. 1968 drawings indicate replacement of some of the railings, angles, and rivets in such a fashion as to be "an exact duplicate of the existing members". In 1979, extensive repairs were performed on the deck, closing the span for over one year. The granite masonry arch spans what was originally a mill race; it was constructed c. 1830.

State Bridge 1 is an exceptional example of a twentieth century metal truss bridge, located at an historic crossing and in a picturesque setting. Only six metal truss bridges remain in Delaware. Although Delaware Department of Transportation photographic archives from the 1920s illustrate approximately ninety metal truss bridges in New Castle County, only three of those were through trusses, thus indicating that it was a rare resource in Delaware even at that time. The only extant through truss still carrying highway traffic in Delaware, it incorporates the masonry substructure of a covered bridge built at that site, as well as an earlier masonry arch. This typically configured truss bridge is composed of characteristic compression members made of channels with lacing bars and plates; bottom chords, diagonals and counters consist of laced angles. The metal truss was a structural form which suited the tremendously rapid technological and geographical progress of nineteenth century railroad and early twentieth century highway travel. It was a popular bridge form well into the twentieth century because of its relative ease of construction and the tendency of manufacturers to encourage standardization. During the nineteenth century, it was a bridge type of diverse forms, with a multitude of proprietary types registered at the U. S. Patent Office; an early example among these was the Pratt truss. The Pratt truss type was widely used from the mid-nineteenth to the early twentieth century for simple highway bridges. Patented in 1844 by Thomas and Caleb Pratt, the original design was for a composite timber and iron truss, wherein the iron diagonals resisted tension and the timber members resisted compressive loads. The Pratt configuration easily adapted into an all metal truss, first built of iron and then steel. Compared with its contemporaneous competitor, the Howe truss, it was more economically suited to the transition in material. Its tension diagonals could be made of small bars or rods, and its compressive members were shorter and could better resist buckling for a given cross-section. The Pratt truss became the predominant metal truss bridge type built in the United States after 1860.