

DELAWARE STATE BRIDGE NO. 21A,  
OPERATOR'S HOUSE  
Rehoboth Road over Mispillion River  
Milford  
Kent County  
Delaware

HAER No. DE-40-A

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
Northeast Region  
Philadelphia Support Office  
U.S. Custom House  
200 Chestnut Street  
Philadelphia, P.A. 19106

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HISTORIC AMERICAN ENGINEERING RECORD

DELAWARE STATE BRIDGE NO. 21A, OPERATOR'S HOUSE

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**LOCATION:** Rehoboth Road over Mispillion River, Milford, Kent County, Delaware. USGS Cedar Creek, Delaware Quadrangle, Universal Transverse Mercator Coordinates: 18.465100.4307700

**DATE OF CONSTRUCTION:** 1929-1930

**ENGINEER:** Keller and Harrington, Consulting Engineers, Chicago, Illinois.

**BUILDER:** Delaware State Highway Department, Warren W. Mack, Chief Engineer, A. G. Livingston, Chief Bridge Engineer

**PRESENT OWNER:** Delaware Department of Transportation

**SIGNIFICANCE:** Delaware Bridge 21A is a typical example of a Scherzer-type, rolling-lift bascule bridge, and the Operator's House is a standard design used on many movable bridges designed by the firm of Keller and Harrington.

**PROJECT INFORMATION:** Delaware Bridge 21A Operators House was recorded in January 1995 by the Cultural Resource Group of Louis Berger & Associates, Inc., East Orange, New Jersey for the Delaware Department of Transportation (DELDOT). The recordation was undertaken pursuant to provisions of a No Adverse Effect Determination between the Federal Highway Administration and the Delaware Historic Preservation Office. Project personnel included Richard M. Casella, Senior Architectural Historian, and Rob Tucher, Senior Photographer.

## DESCRIPTION

Delaware State Bridge 21A, Operator's House was built to shelter the electrical controls for the operation of the bridge, and serve as an office for the bridge operator or "tender". The Operator's House is located at the north end of the bridge, on the west side of Rehoboth Road, set back approximately 30' from the edge of Mispillion River (Figure 1).

The Operator's House consists of a one-story, one-room, masonry and wood frame structure with a hip-roof, resting on a reinforced concrete slab foundation. Original drawings of the structure dated December 28, 1928 are filed at the Delaware Department of Transportation, Dover, Delaware. The building measures 13'x9' on the exterior, with an interior ceiling height of 9'-2" (Figure 2). Structurally the building is unaltered from its original design and retains its original windows, door, and interior finish. According to the original drawings, alterations have been made to the roofing, siding and chimney. As evidenced by the plans and photographs, the widely over-hung hip-roof was originally covered with asbestos "slate" shingles, half-round ridge tiles and a decorative copper pinnacle. These important stylistic components have been removed and replaced with asphalt shingles. The original exterior stucco wall finish has been covered with a vertically grooved plywood product with the trade name Texture 1-11. A single-flue exterior brick chimney was constructed on the west side at some time, replacing what appears in an early photo to be an interior round clay-pipe chimney.

Windows are all identical and consist of the original wood, double-hung 2/1 sash, trimmed with flat casings inside and out. Two windows are located on each side except on the east facing facade which has one window and the entrance door. Original wood frame full-length exterior screens are in place over the windows. The wood door is plain, with a single large glass panel over a single flat wood panel. The interior of the house is finished with plaster walls and ceiling, flat trim, and a strip-hardwood floor overlaid with vinyl tiles. Plans indicate that the wood floor was laid on 2"x2" wood sleepers, laid on the slab, with cinder fill between them. A note on the drawings dated 2-11-30 specifies that wall construction be "cinder concrete block" instead of 2"x4" wood frame construction as shown on the plans. The wall thickness of the existing structure indicates that this change was made.

The original electrical controls for the operation of the bridge remain in the building in working condition. On the south wall between the windows overlooking the bridge is a Westinghouse Type S Controller, manufactured at their Pittsburgh, Pennsylvania plant. The controller is operated by a top mounted lever approximately 12" long with a wood handgrip. The lever swings left or right through a 90 degree arc to raise or lower the bridge. The floor mounted controller is coupled by conduit to a wall-mounted signal-box with four vertically mounted indicator lights. These lights indicate the position of the bridge during opening and closing and are labeled "nearly open", "free", "nearly closed" and "closed". Two bells mounted on the signal box are not labeled. An electrical control panel, measuring approximately 40" wide by

65" high stands on steel pipe legs about 1' away from the west wall. Mounted on the electrical panel are numerous multi-pole knife switches, transformers, relays, and meters. One component is labeled "Westinghouse Magnetic Controller." A main breaker switch is mounted on the west wall of the building in the northwest corner.

## HISTORICAL INFORMATION

### Background

Delaware Bridge 21A Operator's House was erected along with the bridge in conjunction with the building of the Milford Cutoff, an entirely new section of road built by the Delaware Highway Department in 1929 and 1930 to relieve traffic congestion along State Route 113 through downtown Milford. Milford Cutoff, later named Rehoboth Road, was constructed through open marshy land which required extensive filling and is therefore not associated with earlier roads or transportation routes (Delaware State Highway Department 1929:15; Milford Chronicle 1930:1).

When Milford Cutoff and Bridge 21A were constructed the Delaware Highway Department was officially twelve years old and reaching a relatively mature stage of its development. The ever increasing demand for better roads during the early 1920s led to the passage of a motor vehicle fuel tax in 1923. The initial one cent per gallon tax was increased to three cents by 1927 and surpassed bond issues as the principal source of revenue for the highway department. According to Warren Mack, Chief Engineer of the Highway Department between 1929 and 1946, road development between 1926 and 1935 was characterized by the consolidation and improvement of the primary system and the development of a secondary system of low cost highways. Experimental road surface materials promising extremely low construction cost per mile were used to extend improved roads into rural farm areas. Considerable effort was also devoted to relieving traffic congestion created by summer beach traffic. The Milford Cutoff is a direct example of those efforts. The dramatic increase in revenues from the gasoline tax also led to an unprecedented amount of bridge construction during this period. In 1927 twenty-three bridges were under design or construction making it the busiest year to date for the Highway Department (Delaware State Highway Department 1927:4; 1929:17; Mack 1947:544, 547, 548).

### History of Bridge 21A Operator's House

According to the original bridge plans on file with DELDOT, Bridge 21A Operator's House was designed by the firm of Keller and Harrington Consulting Engineers, located in the Ashland Block, Chicago, Illinois. The contract was administered by A. G. Livingston, Chief Bridge Engineer and Warren W. Mack, Chief Engineer, of the Delaware State Highway Department. The contractor responsible for the construction of the Operator's House was not determined,

however, notes on the plans indicated that construction began on March 8, and was completed on April 12, 1930 (DELDOT 1928:np; P.A.C. Spero 1991:61).

Bridge 21A was highlighted as "the most important bridge completed during the year" in the 1930 Annual Report of the State Highway Department. A photograph in the report taken from the north end of the bridge clearly shows the bridge and operator's house as originally constructed. The bridge was completed at an overall cost of \$60,026 and opened for traffic on August 1, 1930. An article in the local Milford newspaper observed that much of the road was built through marshy land and that although it greatly shortens the distance from that required when passing through Milford, "the scenery through which the travelers pass is not of the best" (Delaware State Highway Department 1930:13; *Milford Chronicle* 1930:1).

In 1985, an inspection of the bridge electrical system by department of transportation engineers revealed dangerously deteriorated wiring and numerous safety features non-operable. It was determined that a complete overhaul of the control system was needed. A new operator's house to accommodate the new electrical controls was recently constructed adjacent to the original operators house.

#### Delaware's Bascule Bridge Operator's Houses

The earliest documented evidence of bascule bridge construction in Delaware appears to be the Lewes Bridge over the Lewes and Rehoboth Canal built in 1914 by the Levy Court of Sussex County. This hand operated rolling bascule, almost certainly a patented Scherzer type, was replaced in 1929 due to failure of its foundations. The bridge was replaced with what appears from photographs to be a Keller & Harrington design. The light posts and the operator's house are identical to Bridge 21A. The Lewes bridge is no longer extant (Delaware State Highway Department 1929:11).

Of the six remaining bascule bridges in Delaware, which date from 1923 to 1932, Charles L. Keller was associated with the design of four of them. In 1923 Keller served as a consulting engineer for Bridge 152, a patented Scherzer rolling lift bridge constructed by Keller's former employer, the Scherzer Rolling Lift Bridge Company of Chicago. In 1925, Keller, now a principal in his own firm of Keller & Harrington Consulting Engineers, was hired by the Delaware State Highway Department to provide the final construction inspection for the just completed bascule bridge over Nanticoke River at Seaford (Bridge 151). Apparently Keller established a good relationship with A. G. Livingston, Delaware's Chief Bridge Engineer, and his firm was hired to build three more bascule bridges between 1928 and 1930. In addition to the previously mentioned non-extant Lewes Bridge, these included Bridge 21A and Bridge 159 at Newport. Original drawings of Bridge 159 show the Keller and Harrington trademark light posts and operator's house, however these features are no longer extant and were apparently removed during renovations in 1966 (P.A.C. Spero 1991:62, 66, 69).

Charles Lincoln Keller graduated from Lehigh University in 1893 with a degree in mechanical engineering. In 1901, 1904 and 1912 Keller was granted a total of four patents for bascule bridge designs. Keller was President and Chief Engineer of Scherzer Rolling Lift Bridge Company between 1916 and 1922. The firm of Keller and Harrington was formed sometime between 1924 and 1928 when Charles L. Keller formed a partnership with H. P. Harrington. The firm was still in business as of 1946 (Hovey 1926:144; Leonard 1925:1132).

### REFERENCES CITED

#### Delaware State Highway Department

1924-1930 *Annual Reports of the State Highway department of the State of Delaware.* Delaware State Highway Department, Dover, Delaware. Located in Division of Historical and Cultural Affairs, Department of State, Hall of Records, Dover, Delaware.

#### DELDOT (Delaware Department of Transportation)

n.d. Bridge No. 21A File. Located in Delaware Department of Transportation, Dover, Delaware.

1928 Microfilm plans for Contract No. 104A & 104B, December 26, 1928. Located in Delaware Department of Transportation, Dover, Delaware.

#### Hovey, Otis Ellis

1926 *Movable Bridges.* John Wiley & Sons, Inc., New York.

#### Leonard, John W.

1925 *Who's Who in Engineering.* Who's Who Publishing, Inc. New York.

#### Mack, Warren W.

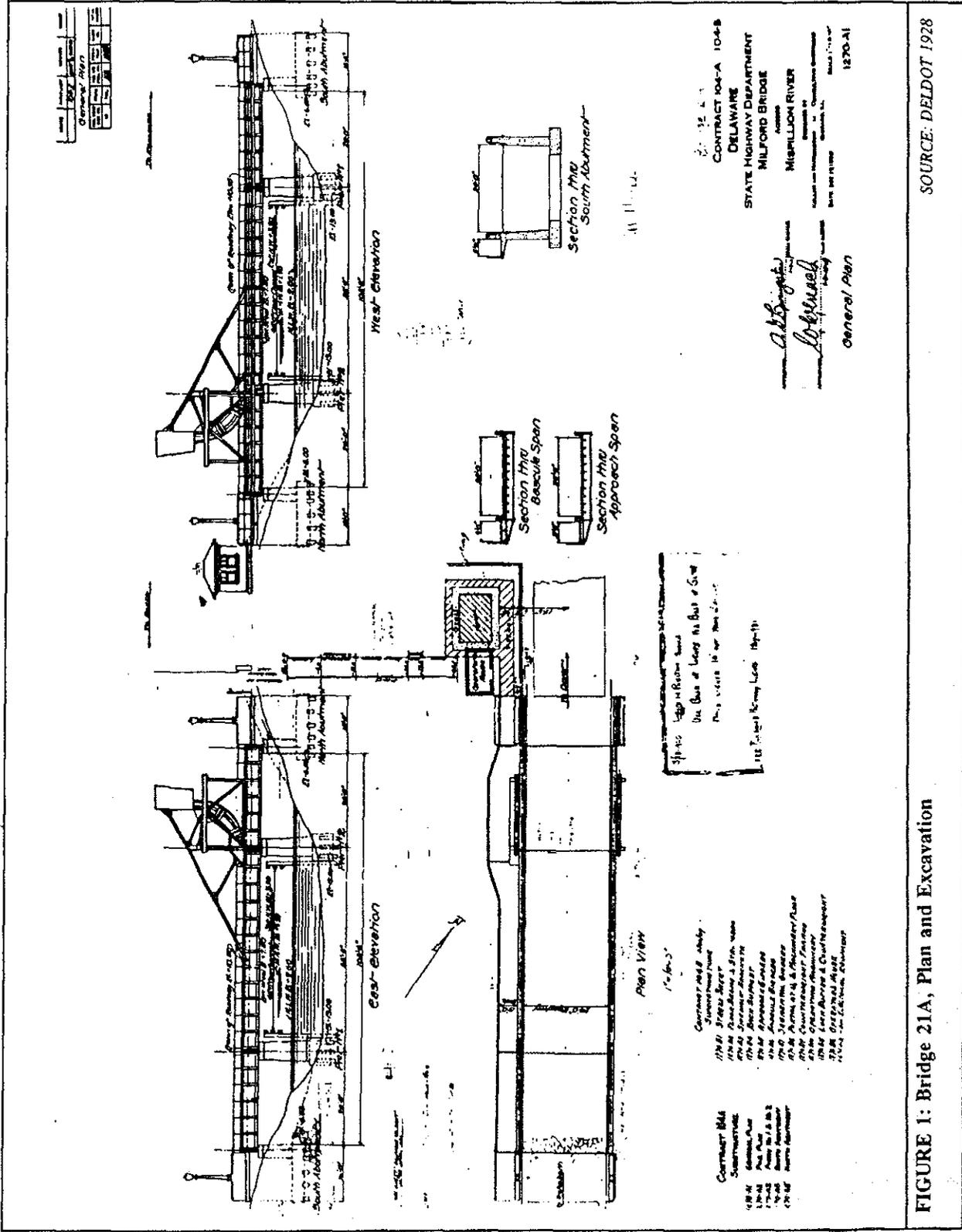
1947 *A History of Motor Highways in Delaware.* In *Delaware, A History of the First State*, pp. 535-550, Lewis Historical Publishing Co. Inc., New York, New York.

#### Milford Chronicle

1930 "Rehoboth Beach Cutoff Now Open." *Milford Chronicle*, August 8, p.1, Milford, Delaware.

#### P. A. C. Spero and Company

1991 *Delaware Historic Bridges: Survey and Evaluation.* Delaware Department of Transportation, Division Of Highways, Dover, Delaware.



SOURCE: DELDOT 1928

FIGURE 1: Bridge 21A, Plan and Excavation

