

Wood, Iron and Combination Trusses in Old Vincennes Bridge

Wabash River Bridge of 1868, Partly Rebuilt Later, to Be Replaced With Concrete Arches—Curious Truss Details

A CURIOUS old highway bridge still in service over the Wabash River at Vincennes, Ind., built originally in 1867 and partly rebuilt and strengthened at different times, is to be replaced soon with a concrete arch bridge which will be a memorial to George Rogers Clark, the explorer. The bridge connects the highway systems of Indiana and Illinois and is on federal route No. 50. Its present condition is shown in Fig. 1, while the original and reconstructed designs are shown in Fig. 2.

Early History of Bridge—From an investigation of the city records, made recently for the purpose of this article by W. C. Mason, president of the Vincennes Historical Society, it appears that on Dec. 18, 1865, an ordinance was passed authorizing the city officials to subscribe for \$20,000 of the stock of the Vincennes Drawbridge Co. The population then was about 5,000 and ferry service had become inadequate. On Nov. 19, 1866, the city was petitioned to take additional stock to the amount of \$25,000 and on Feb. 4, 1867, an ordinance was passed providing for this purchase, making the city's interest \$45,000. The date of letting the contract for construction is uncertain, but the records show that the bridge was completed in 1868. As then built it consisted of four covered timber-truss spans of 148 ft. 7 in. to 156 ft. 8½ in. clear span, on abutments and narrow piers of stone masonry. For navigation, there was a hand-operated combination iron and timber-truss swing span about 145 ft. long, mounted on a masonry pivot pier 20 ft. 6 in. wide.

In April, 1869, the two fixed spans on the Indiana side were partly destroyed by a cyclone. On May 17 the city appropriated \$15,000 for repairs, which work was ordered on June 12. In 1874, with the city owning 60 per cent of the company's stock, it was found necessary to replace these two repaired spans, and it was recommended that iron spans should be built. A contract for this work, at \$10,000, was let to the Massillon Iron Bridge Co. on June 28, 1875, and the new spans were completed

the same year. The structure was operated as a toll bridge until 1889, when the city bought all the outstanding stock of the company and made the bridge free to traffic.

Recent Developments—For the past ten years the bridge has been a link in the state highway systems of Indiana and Illinois. A new timber floor was placed in 1921 at the joint expense of the two states. Negotiations were started about that time looking to the construction of a new bridge. About 1923 the Illinois division of highways in collaboration with the Indiana state highway commission proceeded with the preparation of plans for a high-level steel-truss bridge one city block downstream from the old bridge and approximately parallel to it.

In 1925 the old timber trusses on the Illinois side of the river, from which the protecting roof and siding had been missing for some time, had rotted badly at the bearings, and since financial arrangements for the new bridge were not completed, trestle bents were placed under the first panel point from each end of one span and at one end of the other span, as shown in Fig. 2. Later, bents were placed under the middle of each span, protecting timber cutwaters were placed and the trusses were reinforced. Late in 1926, since arrangements for financing the new bridge were still incomplete and the old timber spans were beyond repair, a contract was let for their replacement with steel-truss spans. This work was finished early in 1927.

The Indiana legislature in 1927 enacted legislation and appropriated funds looking toward the erection of a memorial to George Rogers Clark on the old site of Fort Sackville. Later, the federal Congress appropriated funds for its share of this project. As the site includes the Indiana end of the proposed new bridge and approach, the sponsors of the memorial urged that the bridge should harmonize with the character of the memorial. Consequently, the Indiana state highway commission has completed plans for a high-level seven-span reinforced-concrete arch bridge of the open spandrel type, having a central span of 180 ft. flanked on each side by arches of 170 ft., 145 ft. and 80 ft. span, consecutively, as shown in Fig. 3. In the center span the roadway will be 36 ft. above flood level, or about 32 ft. higher than the deck of the present structure. There will be a 20-ft. roadway and two 5-ft. sidewalks.

In August, 1929, the old swing span was declared unsafe. In order to provide for traffic until the new bridge



FIG. 1—OLD BRIDGE AT VINCENNES, IND. VIEW TAKEN IN FEBRUARY, 1930

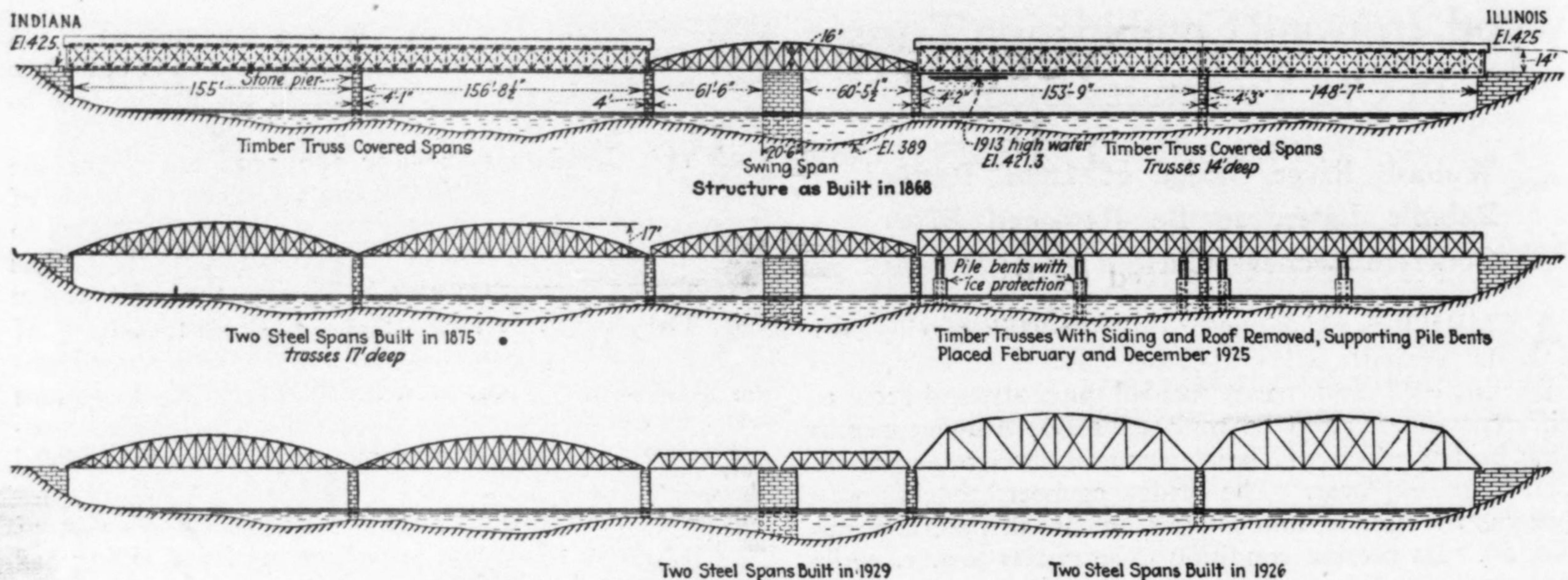


FIG. 2—STAGES IN THE LIFE OF THE WABASH RIVER BRIDGE AT VINCENNES, IND. Top, original construction. Middle, bridge as altered in 1876 and 1925. Bottom, present structure.

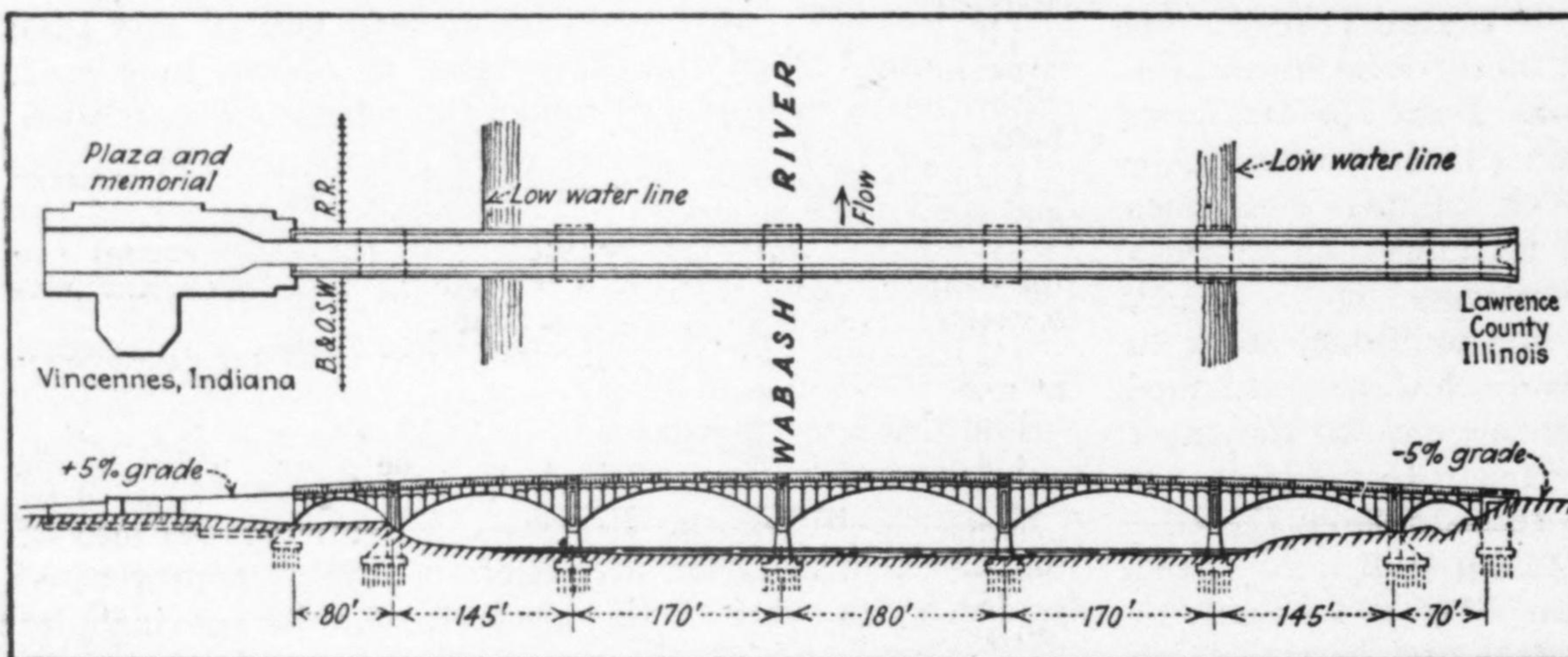


FIG. 3—PROPOSED CONCRETE ARCH BRIDGE
Memorial to George Rogers Clark, explorer.

can be completed, the two states agreed, as an emergency measure, to replace this old swing span with two low-truss fixed spans. This work was completed in October, 1929.

Features of Old Design—Little is given on the substructure construction in available reports. Records do not show the depth of the footings, the method by which the foundation excavation below water line was made or if the foundations are on timber piling or timber grillage. The stone masonry was built up of medium-size blocks of limestone and is still in good condition. In the original timber trusses, of the Howe type, there were counters in every panel. The members are said to have been poplar timbers. The upper chord was built up of three 8x9-in. timbers; the lower chord of four 5x11-in. timbers; the diagonals were composed of two 6x9-in. timbers, and the counters were each a single 6x6-in. timber. Pairs of 1½-in. round rods formed the verticals. The floor was carried on transverse timber joists resting directly on the bottom chords. With trusses spaced 18 ft. c. to c. there was a clear roadway width of 16 ft.

The swing span was never protected from the weather by covering. Its top chord was composed of three 5x½-in. cast-iron plates on edge, bolted together but held apart by spacing blocks. The lower chord had two plates of the same size, similarly bolted and blocked. The floor was carried on transverse timber joists seated directly on the bottom chords. The verticals were pairs of 1½-in. round rods. This is a combination Howe truss type, the diagonals being pairs of 5x7-in. timbers and

the counters single 5x7-in. timbers. This span had a 16-ft. roadway. It is said that the timber diagonals and counters had been replaced a few at a time until few, if any, of the original timbers were in place when the structure was dismantled. This swing span was probably designed as a combination of center and rim bearing. The superstructure dead and live loads were transmitted to a framework of beams under the floor, and the drum was supported on small wide-rimmed wheels turning on axles radiating from a collar around the center. The rack and wheel track were in one piece, with rack and pinion on the outside. Operation was by man power, a crank being applied to a vertical spindle rising through the floor.

In the two bowstring trusses on the Indiana side, built in 1875, the top chords are composed of two 12x½-in. cast-iron plates, placed flat and blocked 18 in. apart by a system of double round-rod bridging. The lower chord has two 10x½-in. plates on edge, carrying the transverse timber floor joists directly. The verticals are of an obsolete section in the form of a cross, 2½ in. on each axis, while the diagonals are ¾-in. round rods. These trusses have several panels of upper lateral bracing at the center of the span and light I-beam floorbeams or joists at alternate panel points. The clear roadway width is 16 ft.

Engineers

The reconstruction and repair work on the old structure and the plans for the new structure have been under the direction of William J. Titus, chief engineer of the Indiana state highway commission, with Fred Kellam, assistant chief engineer in charge of structures. Much of the information for this article was assembled by R. B. Yule, engineer of bridge surveys and investigations. For the Illinois division of highways, the work has been supervised by Frank T. Sheets, state highway engineer, and George F. Burch, bridge engineer.