

CRUM BRIDGE
(Knowlton Bridge)
(Long Bridge)
(Old Camp Bridge)
Spanning Little Muskingum River, TR 384A (formerly Old Camp
Road)
Rinard Mills vicinity
Monroe County
Ohio

HAER OH-123
OH-123

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

CRUM BRIDGE
(Long Bridge)
(Knowlton Bridge)
(Old Camp Bridge)¹
HAER No. OH-123

LOCATION: Spanning Little Muskingum River at Township Road 384A (Old Camp Road), Rinard Mills vicinity, Monroe County, Ohio
UTM: 17.486492.4383501, Rinard Mills, Ohio, Quad

STRUCTURAL TYPE: Multiple kingpost truss with tied arch covered bridge

DATE OF CONSTRUCTION: Main span probably 1867; approaches 1884

DESIGNER/
BUILDER: Main span: Fouts & Townsend, Beverly, Ohio²
Approaches: L.O. Okey, Graysville, Ohio

OWNER: Monroe County, Ohio

PREVIOUS USE: Vehicular and pedestrian bridge

PRESENT USE: Historic landmark and tourist attraction

SIGNIFICANCE: Crum Bridge is an unusual example of a multiple king post truss with tied arch center span. At 192', it is one of the two longest covered bridges in Ohio.

HISTORIAN: Researched and written by Lola Bennett, Summer 2002

PROJECT INFORMATION: The National Covered Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the

¹ Monroe County records do not refer to this bridge by name until about 1875, when it is referred to as "Crum Bridge" (also spelled Crumm or Crumb). An 1882 road description confirms the location of Crum Bridge as Section 6 Township 3 Range 6. The name "Long Bridge" appears in Monroe County records after the approaches were added in 1884. This name is fairly consistently used in county records after 1888 and into the early twentieth century. The Knowlton family owned adjacent property since the 1870s, but the name "Knowlton Bridge" was not used in county records with regard to this structure until the mid-twentieth century. Earlier references pertain to another bridge on Clear Fork near William Knowlton's property. "Old Camp Bridge" was a common name for this bridge by the mid-twentieth century.

² Possibly Thomas Townsend, who built other covered bridges in the Marietta area.

United States. HAER is administered by the Historic American Buildings Survey/Historic American Engineering Record, a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project.

Chronology

- 1866 Little Muskingum Creek surveyed for bridge site
- 1867 90' covered bridge constructed at this site
- 1875 Stonework, trestle work and fills
- 1884 Timber approach spans added; abutments and retaining wall repaired
- 1885 Deck and siding replaced
- 1888 First reference to "Long Bridge" in Monroe County Commissioners Records
- 1895 Roof replaced
- 1896 Crum Bridge damaged by flood; abutments raised and repaired
- 1897 South fill repaired
- 1901 Retaining wall built
- 1908 First reference to this bridge as "Knowlton Bridge" in county records
- 1913 Reported wash off; abutments raised (?)
- 1923 Crum Bridge repaired
- 1928 Roof replaced
- 1938 Crum Bridge repaired
- 1962 Earl Knowlton family donates land for development of a county park
- 1967 Knowlton Covered Bridge Park opened
- 1985 Old Camp Road and Crum Bridge closed to traffic
- 1994 Crum Bridge rehabilitated
- 2002 Crum Bridge recorded by the Historic American Engineering Record

Introduction

The first documented covered bridge in Ohio was built in 1809 across Beaver Creek in Columbiana County.³ Historians estimate that there were once as many as 4,000 covered bridges in Ohio, more than any other state in the nation.⁴ Over time, these structures were lost to fire, floods, neglect and replacement. A list published by the state in 1937 indicates that, at that date, there were 609 covered bridges in Ohio. That number dropped dramatically in the 1950s as modern spans replaced covered bridges. Today, Ohio has 135 surviving covered bridges.

Description

Crum Bridge is a three-span multiple kingpost truss wooden covered bridge, with an auxiliary tied arch in the center span. It rests on cut stone abutments and piers. The total length of the bridge is 196'-0" along the lower chord, the spans measuring 48', 90', and 48'. The truss is 12'-2" high from the top of the upper chord to the bottom of the lower chord with a roadway width of 12'-6".

The trusses of all three spans are framed as multiple kingpost trusses. The upper chord is two parallel 6x8" timbers with wooden shear blocks between them, fastened together with threaded rods that pass through the chords at each panel point and are fastened with a plate and nut on either side. The lower chord consists of two parallel 4x8" timbers with wooden shear blocks fastened together in a similar manner. The upper and lower chords are connected by vertical wooden posts spaced 7'-7" apart and diagonal members (5½x6½") between the posts. The posts of the center span (4x8") are smaller than those of the approach spans (5x7½"). The upper chord is notched around the posts on either side. The posts pass through the lower chord where they are set into notches and fastened with bolts. There are plank hub rails (1½x9") along the length of the bridge trusses, centered about 1½' above the deck.

The main (center) span has a pair of wooden arches sandwiching each truss. The arches span 96' between the piers and rise 10'-4" above the deck. Each arch is composed of paired, laminated arch ribs (four 2½x5" planks bolted together) the ends of which are seated in sawtooth cuts in the lower chord.

Wooden floor beams placed transversely at each panel point make up the floor system. The beams rest on the lower chord and the lower lateral bracing (4x4" timbers) is fastened between them. The lower chords of the approaches rest on top of the lower chords of the main span. In order to keep the floor level, the floor beams on the approaches do not rest on the lower chord; rather they are suspended below the lower chords by means of looped iron hangers which wrap around wooden blocks resting on the lower chord and are secured underneath each floor beam

³ Miriam Wood, *The Covered Bridges of Ohio, an Atlas and History* (Columbus: Old Trail Printing Company, 1993), p.119.

⁴ In 1970, covered bridge historian Richard Sanders Allen published a conservative estimate of 2,000 covered bridges. More recent historical research has doubled that estimate.

with a plate and nuts.⁵ Five lines of wooden joists, or stringers, are laid on top of the floor beams and support the wood plank deck. The roadway surface is plank flooring laid diagonally. The center span is tied to the piers with a 1"-diameter rod, one end of which is secured in a hole drilled in the stone masonry. The other passes through a wood block at the end of arch where it is fixed with a nut.

The upper lateral system consists of transverse tie beams notched into the upper chord and diagonal bracing between the tie beams. There are sway braces between the posts and tie beams. The rafters are notched into the tie beams and extend diagonally upward to meet an opposing rafter at the ridge. There are wooden purlins on the rafters to which the gable roof's metal sheathing is fastened.

Vertical wood siding covers the exterior of the bridge to about 1½' below the upper chord. The sheathing is fastened to wooden nailers on the outer faces of the trusses. The portals are straight with hipped openings.

The abutments and piers are cut, squared stone with mortared joints. The lower chords of the bridge rest on bedding timbers on top of the abutment facewall. The backwalls above the abutments and behind the bedding timbers serve as retainers for the roadbed. Stone wingwalls extend from the backwall at the northerly end of the bridge along a steeply inclined approach.

The north approach has been reinforced with 13x24" rolled steel beams, which sit next to the trusses on the deck above the lower chord. They are attached to the floor beams by threaded rods that pass on either side of the floor beams and are fastened underneath with a metal plate and nuts.

History

In 1818 Isaac Rinard established a gristmill on Little Muskingum River about one and a half miles south of this location, and Baldwin Cox built a sawmill nearby. A small hamlet, known as Rinard's Mills, developed at the site of these early industries.

In June 1866, the Monroe County Commissioners met, "on the banks of the meandering Muskingum, for the purpose of ascertaining the views of the citizens of that part of the county in regard to the location of a bridge across that beautiful stream."⁶ One month later, the commissioners appointed James Lanig to survey two sites, one on the road from Graysville to Cochranville and one at Old Camp Run, and to prepare plans and specifications for one or two bridges over Muskingum Creek.⁷ Lanig examined the proposed sites and prepared plans for a

⁵ Parrish Bridge, in Noble County, has the same suspended floor beam system. Suspended floor beam systems have been widely used, but the technique involving a forged iron strap and a wooden pin is unique to this region of Ohio.

⁶ *Spirit of Democracy* (Woodsfield, Ohio), 26 June 1866.

⁷ Historic maps show Old Camp Run entering Little Muskingum River just below the bridge.

bridge near F.A. Lampings.⁸ A notice to bridge builders published in the local newspaper specified that the bridge at the mouth of Clear Fork was to be: “a covered bridge ... 90 feet long and 14 feet wide, abutments to be 36 feet high.” On December 2, 1866, the county entered into a contract with Fouts and Townsend, contractors from Beverly, Washington County, Ohio, for the erection of two bridges across Muskingum Creek, “one at Jacob Clines and one at or near the mouth of clear fork,” for \$6,300.⁹

No documentation regarding the actual construction of the bridge has been found, but the description above closely matches the center span of the present bridge. Physical evidence strongly suggests that the timber arches flanking the trusses were also part of the original construction. The floor beams and roof system show no evidence of having been extended to accommodate the addition of the outer arches, and the outer faces of the timber trusses show no evidence of ever supporting battens or exterior sheathing. According to the Monroe County Commissioners Records, the bridge at this location was completed in 1867.

On August 10, 1875, the local newspaper reported, “The approaches to the bridge on Clear Fork of Muskingum Creek having been washed away, the County Commissioners will meet there on Tuesday the 17th inst, to let the contract for the repair of the same.”¹⁰ A subsequent notice of this meeting is somewhat confusing, in that it refers to the erection of abutments: “The County Commissioners met at the mouth of Clear Fork the 17th inst., and contracted with O.F. Flint, Esq., to erect abutments to replace those recently carried away by the floods.”¹¹ It is not known whether the approaches or abutments were repaired, although the Monroe County Commissioners Records show that O.F. Flint was paid \$756.89 for “stonework, trusselwork and fills on Crumb [sic] Bridge across muskingum creek.”¹²

It appears that the present approach spans were built in 1884. Since they are now covered, the exterior of the bridge gives the appearance of having been the one built; however, a comparison of the interior of the center and approach spans shows that the framing members are sized differently, the floor system is put together differently, and there are distinct breaks in construction at the piers. On September 23, 1884, the Monroe County Commissioners contracted with the Okey brothers for “building and erecting two new wooden approaches to Crum Bridge across Muskingum Creek near the mouth of Clear Fork.” The same day, they awarded a second contract to Cornelius Okey

to build and raise, with dressed sandstone, in a good and workmanlike manner, the two abutments at the end of the approaches to Crum Bridge, to such a hight [sic] that the floor of the approaches will be on a level with the Bridge floor; said

⁸ Jno. B. Noll’s 1869 “Map of Monroe County, Ohio” shows that F.A. Lamping owned the property surrounding the bridge site at that date. Lamping was elected County Commissioner in 1866 and may have initiated the petition for the bridge.

⁹ *Monroe County Commissioners Records*, Volume 3, December 2, 1866, p. 423.

¹⁰ *Spirit of Democracy*, 10 August 1875.

¹¹ *Spirit of Democracy*, 24 August 1875.

¹² *Monroe County Commissioners Records*, Volume 4, p.125.

work to be done for \$3.00 per perch of masonry, and to be completed immediately, so as not to cause delay in building the approaches to the Bridge by Okey and Bro.¹³

The bridge was apparently rebuilt in 1896 following a flood that damaged the structure and abutments, although the exact nature of that rebuilding is unclear from the documentary evidence. The newspaper only reported that the bridge was damaged, but does not indicate the extent of the damage:

Last week this county was visited by the heaviest rainfall and most destructive floods ever known to our people. Thursday night and Friday it rained almost incessantly and the runs and creeks were swollen until they spread from hill to hill, sweeping almost everything before them...The Miller bridge, the Roth bridge, the Atkinson run bridge, the Payne's run bridge and the Negro run bridge along Sunfish creek, were washed away. On Muskingum creek the I.N. Dougherty bridge was washed away and the Foreaker bridge and the Long bridge at Rinard's Mills were damaged. It is also reported that the bridge at Pryor's station was carried off. The county commissioners are making an investigation of the bridges this week and will take steps at once to repair them.¹⁴

According to Monroe County Commissioners Records, the bridge was "supported temporarily," and in the fall of 1896, S.N. Cline was paid \$350.16 for "raising and repairing abutments to Long Bridge" and I.P. Cline, a local stonemason, was paid \$600.00 for "rebuilding Long Bridge."¹⁵

The bridge reportedly floated off its piers during another flood in 1913, but it has not been possible to determine whether this incident actually occurred to the Long Bridge or to some other structure.¹⁶ The Monroe County Commissioners Records indicate that a wooden bridge was put back on its foundations in that year, but state that that structure spanned Clear Fork, which may be an entirely different location, or a garbled reference to this one, at the mouth of Clear Fork.

The bridge underwent extensive repairs in 1938, when Kentucky's covered bridge specialist, Louis Stockton Bower, Jr., added diagonal steel rods, additional floor beams and stringers.

In 1962, Earl Knowlton leased six acres of property adjacent to the bridge to the Knowlton Covered Bridge Park Association for a period of ninety-nine years.¹⁷ A committee of three

¹³ *Monroe County Commissioners Records*, Volume 5, p.129.

¹⁴ *Spirit of Democracy*, July 30, 1896.

¹⁵ *Monroe County Commissioners Records*, Volume 6, p. 519. Given the cost, the 1896 work was presumably a major repair, rather than a complete replacement.

¹⁶ Southern Ohio Covered Bridge Committee Records, Manuscript MSS-878, Series II, Box 3, Folder 127, Ohio Historical Society, Columbus, Ohio.

¹⁷ Knowlton Covered Bridge Park district established April 27, 1962 by Monroe County Probate Court. Court of Common Pleas, Probate Division file #6183.

trustees now cares for the bridge and park. The bridge was closed to vehicular traffic in the 1980s.

According to the Monroe County Assistant County Engineer, the bridge underwent extensive repairs in the early 1990s, including the addition of a large steel I-beam to strengthen the northerly span and the replacement of the exterior siding.

Design

Dating to the Middle Ages, the kingpost is the oldest and simplest bridge truss design. It is based on the inherently stable form of the triangle, which tends to resist deformation. The kingpost truss is essentially a triangle with a central post, known as the kingpost. The two diagonal timbers are braced on the ends of the lower chord and function in compression, transmitting loads from the center of the bridge back to the abutments. The multiple kingpost truss can span greater distances than the simple kingpost. According to the *World Guide to Covered Bridges*, there are approximately ninety-five examples of the kingpost truss design remaining in the United States.¹⁸

Although Crum Bridge is usually described as a Burr truss, the center span actually incorporates a tied arch, which makes it somewhat unusual and interesting from an engineering perspective. In a tied arch, the ends of the arches are fitted into slots in the ends of the lower chord rather than extending below the bottom chord to the piers or abutments. The horizontal thrust of the arch is therefore resisted by the tension in the bottom chord, rather than being carried to the piers.¹⁹

¹⁸ National Society for the Preservation of Covered Bridges, *World Guide to Covered Bridges* database 2002.

¹⁹ See HAER No. VT-36, Bests Bridge.

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