

WHITTIER BRIDGE  
(Mt. Whittier Bridge)  
(Bearcamp Crossing)  
Spanning the Bearcamp River  
West Ossipee  
Carroll County  
New Hampshire

HAER NH-50  
*HAER NH-50*

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

FIELD RECORDS

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

### WHITTIER BRIDGE<sup>1</sup> (Mt. Whittier Bridge<sup>2</sup>) (Bearcamp Crossing<sup>3</sup>)

HAER No. NH-50

- Location:** Spanning the Bearcamp River at Old NH 25 (Nudd Road), .25 mile west of the intersection of NH 25 and NH 16, West Ossipee, Carroll County, New Hampshire
- Coordinates:** Whittier Bridge is located at latitude: 43.820278, longitude: -71.199722. The coordinate represents the center of the structure. This coordinate was obtained on July 23, 2009, using a GPS mapping grade unit accurate to +/- 3 meters after differential correction. The coordinate's datum is North American Datum 1983. The Whittier Bridge location has no restriction on its release to the public.
- Structural Type:** Paddleford truss with arch
- Construction Date:** 1870-71
- Builder:** Attributed to Jacob Berry, North Conway, New Hampshire
- Owner:** Town of Ossipee, New Hampshire
- Original Use:** Vehicular bridge
- Present Use:** Closed to traffic, awaiting rehabilitation
- Significance:** Whittier Bridge is a good example of the bridge truss developed in the 1840s by Peter Paddleford of Littleton, New Hampshire. The design features long counterbraces to help distribute loads throughout the truss. Though never patented, the Paddleford truss dominated covered bridge construction in northern New England for over half a century.
- Historian:** Lola Bennett, 2009

---

<sup>1</sup> Like nearby Mt. Whittier, this bridge is named for Massachusetts poet John Greenleaf Whittier (1807-1892), who summered at West Ossipee in the late 1800s.

<sup>2</sup> The earliest written reference found to "Mt. Whittier Bridge" is the 1936 *Ossipee Annual Reports*.

<sup>3</sup> The first bridge at this location was known as "The Great Bridge" or "Nickerson Bridge." Subsequent bridges were referred to by various names, including "West Ossipee Bridge," "Bearcamp Bridge," and "Bearcamp Crossing."

**Project  
Information:**

The National Covered Bridges Recording Project was undertaken by the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. HAER is administered by Heritage Documentation Programs (Richard O'Connor, Chief), a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration's National Historic Covered Bridge Preservation Program funds the project.

Christopher H. Marston, HAER Architect, served as project leader. The HAER field team consisted of Anne E. Kidd, field supervisor; Jeremy T. Mauro and Bradley M. Rowley, architects; and Csaba Bartha, ICOMOS Intern, Romania. Lola Bennett wrote the history. Jet Lowe, HAER Photographer, produced the large-format photographs.

## CHRONOLOGY

- 1776 Capt. John Dudley builds wagon road from Wolfeboro to Conway, via West Ossipee
- 1785 Town of Ossipee incorporated
- 1788 New Hampshire granted statehood
- 1791 First documented bridge built at this site
- 1805 America's first covered bridge erected at Philadelphia
- 1830s Peter Paddleford (1785-1859) develops the Paddleford truss
- 1849 Previous bridge built at this site
- 1867 Poet John Greenleaf Whittier first visits West Ossipee
- 1869 Freshet destroys bridges on Bearcamp River
- 1870 Town of Ossipee votes to build a covered bridge at this site
- 1871 Present bridge completed at this site
- 1909 Whittier Bridge's wood roof replaced with metal roof
- 1928 Electric lights installed in Whittier Bridge
- 1936 Whittier Bridge rehabilitated
- 1955 Whittier Bridge bypassed
- 1958 Steel telltales installed at portals of Whittier Bridge
- 1982 Whittier Bridge closed to traffic; steel cables installed to prevent collapse
- 1983 Graton Associates restores Whittier Bridge at a cost of \$85,000
- 1984 Whittier Bridge listed in the National Register of Historic Places
- 1989 Whittier Bridge closed to traffic
- 1998 Federal Highway Administration (FHWA) launches National Historic Covered Bridge Preservation Program
- 2007 Whittier Bridge appears on New Hampshire Preservation Alliance's "Seven to Save" list
- 2008 Whittier Bridge moved off abutments for future rehabilitation
- 2009 Historic American Engineering Record records Whittier Bridge

## NEW HAMPSHIRE COVERED BRIDGES

The first covered bridges appeared in New Hampshire in the 1820s. Among the first to be erected was the Bath-Haverhill Bridge, a Town lattice truss built at Woodville in 1829.<sup>4</sup> Today, that structure is one of the oldest covered bridges in the United States.<sup>5</sup> An estimated 300 to 400 covered bridges once existed in New Hampshire.<sup>6</sup> Over time, ice, floods, accidents, roadway “improvement” projects, arson and neglect took their toll. In 1941, there were seventy-seven covered bridges remaining; by 1954 that number had dropped to fifty-seven. Since then, more covered bridges have been lost, but at least a dozen modern covered bridges have been built. According to the National Society for the Preservation of Covered Bridges and the New Hampshire Department of Transportation, New Hampshire currently has fifty-three covered bridges.<sup>7</sup>

## DESCRIPTION

Whittier Bridge is a single-span Paddleford truss augmented with laminated arches. The bridge is 132'-7" long with a clear span of 114'-0". It has an overall width of 20'-6" with a roadway width of 14'-10". The trusses are 14'-0" high, with a posted vertical clearance of 12'-5". The bridge was moved off its stone masonry abutments in July 2008 and currently stands on the south river bank awaiting rehabilitation.

Each truss has sixteen panels. The roof and gable ends project some 6' beyond the truss end posts and are supported by long timber struts. These projections on both ends help shelter the timber floor from snow and rain. The drops are not diagonal but truncated posts, needed to combine the ends of the top chord.<sup>8</sup>

The truss geometry is similar to that of a multiple kingpost truss, but with long diagonal counterbraces that extend across more than one panel. The top chords comprise four lines of 3-<sup>1</sup>/<sub>2</sub>" x 7-<sup>1</sup>/<sub>2</sub>" planks laid on edge and fastened together with 1-<sup>3</sup>/<sub>4</sub>" treenails. The bottom chords comprise four lines of 3" x 1'-0" planks, blocked and bolted together. Vertical posts, measuring 7-<sup>3</sup>/<sub>4</sub>" x 8-<sup>3</sup>/<sub>4</sub>", are notched and bolted through the top and bottom chords. The 4-<sup>1</sup>/<sub>8</sub>" x 8-<sup>3</sup>/<sub>4</sub>" braces, angling up toward the center of the bridge, are notched into the posts. The 3-<sup>7</sup>/<sub>8</sub>" x 5-<sup>3</sup>/<sub>4</sub>" counterbraces angle down toward the center of the bridge and are pinned and notched at each intersection. Upper lateral bracing consists of 5-<sup>5</sup>/<sub>8</sub>" x 7-<sup>3</sup>/<sub>4</sub>" tie beams crossing between panel points and 3-<sup>1</sup>/<sub>2</sub>" x 5-<sup>3</sup>/<sub>4</sub>" cross braces within each panel. There are 3-<sup>1</sup>/<sub>2</sub>" x 4-<sup>3</sup>/<sub>4</sub>" sistered knee braces between the tie beams and the vertical posts. Lower lateral bracing consists of 5-<sup>1</sup>/<sub>2</sub>" x 5-<sup>1</sup>/<sub>2</sub>" cross-bracing between the bottom chords.

---

<sup>4</sup> See HAER No. NH-33, Bath-Haverhill Bridge.

<sup>5</sup> The Hyde Hall Bridge (HAER No. NY-330) in Otsego County, New York, was reportedly built in 1825 and is believed to be the oldest extant covered bridge in the United States.

<sup>6</sup> Richard Sanders Allen, *Covered Bridges of the Northeast* (Brattleboro, VT: Stephen Greene Press, 1957), 40. Allen states that there were more than 200 covered bridges in New Hampshire. More recent research by Richard Roy of the National Society for the Preservation of Covered Bridges has documented more than 300.

<sup>7</sup> This number includes several replacement covered bridges built in the twentieth century.

<sup>8</sup> Truss description provided by Tim Andrews, in email exchange with Christopher Marston, 3 November 2011.

Presumably added in the early twentieth century, the laminated arches are bolted to the inner face of the trusses. Each arch is comprised of fifteen layers of 2" x 2'-3-<sup>1</sup>/<sub>8</sub>" plank. The arches spring from a concrete footing on the abutment, rise 17'-0" to the crown and span 107'-6".

The deck system is not original, but probably closely approximates the original configuration. It consists of 9-<sup>3</sup>/<sub>4</sub>" x 1'-0" transverse floor beams suspended from the arches by 1"-diameter metal hanger rods, 3-<sup>1</sup>/<sub>2</sub>" x 7-<sup>1</sup>/<sub>2</sub>" stringers placed longitudinally on the floor beams and 1-<sup>1</sup>/<sub>8</sub>" x 3-<sup>1</sup>/<sub>8</sub>" timber planks laid transversely on the stringers. Some of the deck was removed in February 2007.

The 4" x 4-<sup>1</sup>/<sub>2</sub>" common rafters, with 4" x 2-<sup>1</sup>/<sub>2</sub>" sisters, support a gable roof covered with a patchwork of metal roofing on top of the former cedar shingle roof. The top chords and roof extend 6'-11" past the end posts for added weather protection. The bridge is sided with unfinished boards placed vertically on the sides of the bridge and horizontally on the gable ends. The eaves are open along the entire length of the bridge. Exterior cladding is 11'-11" long at the ends of the bridge and 5'-7" long at center span, leaving a large opening, approximately 6' x 75', to allow light and air into the structure. The portals originally had clipped corners, but now have squared-off openings. They are currently boarded over to prevent public access.

A sign above the south portal reads: BEARCAMP CROSSING / LIMITED TO / HORSE DRAWN CARRIAGES / MOTORIZED PLEASURE VEHICLES / TWO AND THREE WHEELERS / SLEIGHS AND PEDESTRIANS / SPEED LIMITS / HORSES • SLOW CANTER / VEHICLES • 5 M.P.H.

A sign above the north portal reads: WHITTIER COVERED / • BRIDGE • / an / OSSIPEE HISTORIC / • MONUMENT • / Please Maintain Cleanliness and / Refrain from disfiguring timbers / fishing is permitted...

## DESIGN

Peter Paddleford (1785-1859) of Littleton, New Hampshire, was a prominent nineteenth-century millwright and bridge builder in northern New England. He built several major covered bridges, including two across the Connecticut River between Vermont and New Hampshire, as well as numerous lesser-known spans in the upper reaches of both states. Initially, Paddleford used the 1830 Long truss for his bridges, but he soon developed his own truss design with long counterbraces extended over more than one panel, which helped distribute loads and increase the truss's rigidity.<sup>9</sup>

Although never patented, the Paddleford truss dominated covered bridge construction throughout northern New England for over half a century. This was due, in part, to the work of Peter's son,

---

<sup>9</sup> See HAER No. OH-122, Eldean Bridge.

Weston's Bridge (1844) at Fryeburg, Maine, is one of the earliest known examples of the Paddleford truss. According to covered bridge historian Joseph Conwill, potential sources of inspiration for Paddleford's design could have come from nearby covered bridges at Bath, New Hampshire, or Thetford Center, Vermont. Both bridges have braces that extend over more than a single panel.

Philip Henry Paddleford (1815-1876), who went into partnership with his father in 1835 and continued building bridges until his death in 1876.<sup>10</sup> The Paddleford truss remained popular in the region until the turn of the century. Twenty-one examples can still be found across northern New England.

Table: Paddleford Truss Examples

HAER #	BRIDGE	COUNTY	STATE	DATE	ARCH	BUILDER
	LOVEJOY	OXFORD	ME	1867		
	HEMLOCK	OXFORD	ME	1857	√	JACOB BERRY
	BENNETT	OXFORD	ME	1898		MASON BROTHERS
ME-69	SUNDAY RIVER	OXFORD	ME	1872		HIRAM YORK
	PORTER - PARSONFIELD	OXFORD - YORK	ME	1858		JACOB BERRY
NH-41	HONEYMOON	CARROLL	NH	1876	√	CHARLES & FRANK BROUGHTON
	BARTLETT	CARROLL	NH	1851	√	
	SACO RIVER	CARROLL	NH	1890	√	CHARLES & FRANK BROUGHTON
	SWIFT RIVER	CARROLL	NH	1869	√	JACOB BERRY
	ALBANY	CARROLL	NH	1858		AMZI RUSSELL / LEANDER MORTON
	DURGIN	CARROLL	NH	1869	√	JACOB BERRY
NH-50	WHITTIER	CARROLL	NH	1870	√	JACOB BERRY
	HAPPY CORNER	COOS	NH		√	
	CLARKSVILLE	COOS	NH	1876	√	
	GROVETON	COOS	NH	1852	√	CAPT. CHARLES RICHARDSON
	STARK VILLAGE	COOS	NH	1862		CAPT. CHARLES RICHARDSON
NH-45	MECHANIC STREET	COOS	NH	1862		
	SWIFTWATER	GRAFTON	NH	1849	√	
	FLUME	GRAFTON	NH	1871		LINCOLN TURNPIKE CO.
	SANBORN	CALEDONIA	VT	1867		
	LORD'S CREEK	LAMOILLE	VT	1881		JOHN D. COLTON

<sup>10</sup> James Robert Jackson and George Clarence Furber, *History of Littleton, New Hampshire* (Cambridge, MA: University Press, 1905), 4.

## HISTORY

This crossing was part of an early overland route from Wolfeboro to Conway, which was laid out in 1776. Presumably, there was a timber bridge here from an early date, although no documentation has been found concerning such a structure. In 1791, the Town of Ossipee built a new bridge known as “Nickerson Bridge” at this location.<sup>11</sup> The crossing was heavily used and, according to Ossipee town records, the structure was repaired, rebuilt or replaced numerous times prior to construction of the present covered bridge.<sup>12</sup>

In November 1869, a flood swept away all bridges on the Bearcamp River. At a March 1870 town meeting, residents of Ossipee voted “to instruct the selectmen to build a covered bridge across Bearcamp River.”<sup>13</sup> Town records contain no further information about the construction of this bridge, but it is traditionally credited to Jacob Berry of North Conway. The bridge was reportedly completed in 1871.<sup>14</sup>

The laminated arches were presumably added sometime in the late nineteenth or early twentieth century to increase the bridge’s load-carrying capacity for motor vehicles.<sup>15</sup> Approximately half of the surviving Paddleford truss bridges have laminated arches.

The covered bridge over Bearcamp River remained in continuous use until March 1936 when a freshet seriously damaged the structure. For the next several months, traffic was detoured over the Mountain Road through Tamworth and Chocorua.<sup>16</sup> State Highway Department engineers recommended replacement of the bridge with a modern steel span, but public sentiment prevailed. On May 1, the Governor’s Council voted that the covered bridge “should be kept standing as long as possible in view of its historic value.”<sup>17</sup> Work began in May and was completed in July 1936, under the supervision of State Highway Department foreman Harry Lee.<sup>18</sup> The project consisted of raising the bridge 2'-4", replacing the bottom chords and deck, building new concrete approaches and installing new siding.<sup>19</sup> The span was reopened to traffic on July 3, 1936.

In 1955, Route 16 was built through West Ossipee, and a new highway bridge was erected a quarter-mile downstream, bypassing the old covered bridge. Whittier Bridge was kept open to cars, but trucks were prohibited from using it. In 1958, steel telltales were installed at the portals

---

<sup>11</sup> Edward M. Cook, Jr., *Ossipee, New Hampshire, 1785-1985: A History*, Vol. I (Portsmouth, NH: Peter E. Randall, 1989), 137.

<sup>12</sup> Cook, 138-139.

<sup>13</sup> Town of Ossipee, New Hampshire, *Town Meeting Minutes*, Book 8, 8 March 1870, 206.

<sup>14</sup> “Covered Bridge at West Ossipee,” *Carroll County Independent*, 27 March 1936, 8.

<sup>15</sup> Historian David Ruell states that the arches “appear to have been added in the late 19<sup>th</sup> century”; other historians have suggested that this may have been one of the many covered bridges strengthened in the early twentieth century to carry motor vehicles.

<sup>16</sup> “County Recovers from Battering of High Waters,” *Carroll County Independent*, 27 March 1936, 1.

<sup>17</sup> “Highway Department Will Repair Historic Bridge,” *Carroll County Independent*, 1 May 1936, 1.

<sup>18</sup> Town of Ossipee, New Hampshire, *Annual Reports*, 1936, 17; “Bearcamp Bridge Open to Traffic,” *Carroll County Independent*, 10 July 1936, 1.

<sup>19</sup> “Bearcamp Bridge Opens to Traffic.” The specifications for these repairs are reportedly at the Ossipee Historical Society.

to keep oversize vehicles off the aging span.<sup>20</sup> Being bypassed was a double-edged sword: the bridge no longer had to carry heavy traffic, but funds for maintenance became scarcer.

By 1981, the structure had deteriorated to the point that engineers declared it unsafe and closed the span to traffic. Summer resident Gordon Pope donated funds to help pay for an \$85,000 restoration project as a memorial to his late wife, Nancy Sheldon Pope (1916-1982). Pope's gift was matched by a grant from the State of New Hampshire.<sup>21</sup> Work began in November 1982 and was completed in August 1983 by Graton Associates of Ashland, New Hampshire. The bridge was suspended from steel cables while it was being repaired. The restoration included building a new downstream (east) bottom chord, replacing rotted timbers in the top chords and arches and installing a new wood shingle roof.<sup>22</sup> The originally closed sides of the bridge were partially opened to let in light and air, and the steel tell-tales were removed from the portals. The restored bridge was re-dedicated on August 19, 1983.<sup>23</sup> Whittier Bridge was listed in the National Register of Historic Places in 1984.

The bridge was rescued from collapse after record-breaking snows in the winter of 2007-2008. In February 2008, snow was removed from the roof, and 4,000 pounds of planking were removed from the deck.<sup>24</sup> The span was moved off its abutments in July 2008 and is currently awaiting rehabilitation. The rehabilitation project is funded by a \$632,000 grant from the Federal Highway Administration's National Historic Covered Bridge Preservation Program.

## **BUILDER**

Bridge builder Jacob E. Berry (1802-1870) of North Conway, New Hampshire, together with his sons, Jacob H. Berry (1827-1892) and Horace W. Berry (1831-1921), built a number of bridges in Carroll County, including four Paddleford truss covered bridges that still stand. While the records are not clear, the fact that Jacob E. Berry (1802-1870) died in May 1870 suggests that the younger Jacob Berry probably built this particular bridge. Berry may have been assisted his brother, Horace and/or Charles Austin Broughton (1835-1909), another carpenter from Conway.<sup>25</sup>

---

<sup>20</sup> The telltales were removed during the 1983 rehabilitation.

<sup>21</sup> "Whittier Covered Bridge Reopened," *Laconia Evening Citizen*, 25 August 1983, 1.

<sup>22</sup> Shelly Gregoire, "Restoring A Covered Bridge," *Granite State News*, 20 April 1983, 3.

<sup>23</sup> Shelly Gregoire, "Governor Praises Restoration of Bridge," *Carroll County Independent*, 24 August 1983, 1.

<sup>24</sup> New Hampshire Division of Historical Resources, "Work Begins on Whittier Covered Bridge," available at <http://www.nh.gov/nhdhr/publications/documents/WhittierBridgeHandout.pdf>, accessed 8 March 2009.

<sup>25</sup> "Ossipee's Old Covered Bridge at West Ossipee," *Carroll County Independent*, 22 February 1935, 1; James Welch, "Covered Bridge at West Ossipee," *Carroll County Independent*, 27 March 1936, 8.

**SOURCES**

Allen, Richard Sanders. *Covered Bridges of the Northeast*. Brattleboro, VT: Stephen Greene Press, 1957.

“Bearcamp Bridge Open to Traffic.” *Carroll County Independent*, 10 July 1936, 1.

Cook, Edward M., Jr. *Ossipee, New Hampshire, 1785-1985: A History*, Vol. I. Portsmouth, NH: Peter E. Randall, 1989.

Conwill, Joseph D. “Paddleford Truss Framing.” *Timber Framing*, March 2005, 12-15.

“County Recovers from Battering of High Waters.” *Carroll County Independent*, 27 March 1936.

Gregoire, Shelly. “Covered Bridge, Now Restored, Survives Floods, Time.” *Carroll County Independent*, 17 August 1983, 1.

\_\_\_\_\_. “Governor Praises Restoration of Bridge.” *Carroll County Independent*, 24 August 1983, 1, 20.

\_\_\_\_\_. “Restoring A Covered Bridge.” *Granite State News*, 20 April 1983, 3.

“Highway Department Will Repair Historic Bridge.” *Carroll County Independent*, 1 May 1936, 1.

Howe, John. “Builders Restoring Famed Bridge.” *Laconia Evening Citizen*, 20 January 1983.

Jackson, James Robert and George Clarence Furber. *History of Littleton, New Hampshire*. Cambridge, MA: University Press, 1905.

Kenyon, Thedia Cox. *New Hampshire’s Covered Bridges*. Sanbornville, NH, 1957.

Kilbourne, Frederick W. *Chronicles of the White Mountains*. New York: Houghton Mifflin Co., 1916.

Merrill, Georgia Drew. *History of Carroll County, New Hampshire*. Boston: W.A. Fergusson & Co., 1889.

New Hampshire Division of Historical Resources. “Work Begins on Whittier Covered Bridge.” Available at <http://www.nh.gov/nhdhr/publications/documents/WhittierBridgeHandout.pdf>, accessed 8 March 2009.

Ossipee, New Hampshire. *Annual Reports of the Town of Ossipee*, 1880-present.

Ossipee, New Hampshire. *Town Meeting Minutes*, 1785-present.

“Ossipee’s Old Covered Bridge at West Ossipee.” *Carroll County Independent*, 22 February 1935, 1.

Ruell, David. “National Register of Historic Places Inventory—Nomination Form: Whittier Bridge.” 31 August 1983.

Walling, H.F. “Topographical Map of Carroll County, New Hampshire.” New York: Smith & Peavey, 1861.

Welch, James. “Covered Bridge at West Ossipee.” *Carroll County Independent*, 27 March 1936.

“Whittier Covered Bridge Reopened.” *Laconia Evening Citizen*, 25 August 1983.