HALL BRIDGE
(Osgood Bridge)
Spanning Saxtons River at Paradise Hill Road
Rockingham
Windham County
Vermont

HAER VT-40
HAER VT-40

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

HALL BRIDGE[1]
(Osgood Bridge)

HAER No. VT-40

Location: Spanning Saxtons River at Paradise Hill Road (TH 50), immediately north of the intersection of VT 121, 1.2 miles east of Saxtons River Village, Rockingham Township, Windham County, Vermont

Coordinates: The Hall Bridge is located at latitude: 43.13786, longitude: -72.48759. 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 Hall Bridge has no restriction on its release to the public.

Structural Type: Town lattice truss

Construction Date: 1982

Builder: Graton Associates, Ashland, New Hampshire

Owner: Town of Rockingham, Vermont

Use: Vehicular bridge

Significance: Hall Bridge was erected in 1982 to replace an 1867 covered bridge that had collapsed under an overweight vehicle in 1980. Although not a replica of its predecessor, Hall Bridge is an authentic covered bridge constructed using traditional materials and timber framing methods. It is an excellent example of a Town lattice truss, patented in 1820 by architect Ithiel Town (1784-1844) of New Haven, Connecticut.

Historian: Lola Bennett, 2009

Project Information: The National Covered Bridges Recording Project was undertaken by the Historic American Engineering Record (HAER), a long-range program to

[1] In the late nineteenth and early twentieth century, the previous bridge at this site was commonly known as "Osgood Bridge." It was named for Saxtons River native Holland W. Osgood (1834-1916), who owned the adjacent property. Sometime prior to 1920, Webster Hall (1871-1971) purchased the property, and locals began referring to this crossing as "Hall Bridge." Hall's daughter, Priscilla [Hall] Cowan (b. 1910), still lived on the farm when the present bridge was erected in 1982.

document historically significant engineering and industrial works in the United States. HAER is administered by the Heritage Documentation Programs division (Richard O'Connor, Chief), part of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration's National Historic Covered Bridge Preservation Program funded 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. David Wright, President of the National Society for the Preservation of Covered Bridges, provided assistance.

CHRONOLOGY

1752 Rockingham Township chartered

1783 First settlers arrive at present-day Saxtons River

1791 Vermont granted statehood

1805 America's first covered bridge erected at Philadelphia

1820 Saxtons River incorporated

Ithiel Town (1784-1844) patents the Town lattice truss

1824 Vermont's first covered bridge erected at Highgate Falls

1838 Present-day Hall Bridge Road laid out by the Town of Rockingham

1856 Crossing appears in *McClelland's Atlas of Windham County, Vermont*

1867 Sanford Granger (1796-1882) erects first covered bridge at this location

1900 Bellows Falls & Saxtons River Street Railway Co. builds Barber Park

1924 Bellows Falls & Saxtons River Street Railway Co. ceases operations

1927 November floods destroy an estimated 300 covered bridges in Vermont

1940 A census counts 180 covered bridges in Vermont

1941 First book published about Vermont covered bridges[2]

1954 Milton Graton (1908-1994) begins career restoring and building covered bridges

1973 Hall Bridge listed in the National Register of Historic Places[3]

1980 Hall Bridge destroyed by overweight vehicle

1982 Graton Associates erects new covered bridge at this site

1998 Federal Highway Administration (FHWA) launches National Historic Covered Bridge Preservation Program

VTrans establishes Historic Covered Bridge Preservation Committee

2001 A census counts 100 covered bridges in Vermont

2009 Historic American Engineering Record records Hall Bridge

2011 Hurricane Irene washes away one quarter of southwest abutment and damages lower chord

Timothy Andrews of Barns and Bridges of New England repairs bridge

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[2] Herbert Wheaton Congdon, *The Covered Bridge* (Brattleboro, Vermont: Stephen Daye Press, 1941).

[3] The former covered bridge is still listed in the National Register of Historic Places; the present covered bridge does not meet age requirements for listing in the National Register.

VERMONT COVERED BRIDGES

In 1824, the Keyes brothers built Vermont's first known covered bridge across the Mississquoi River at Highgate Falls.[4] Others soon followed and by the end of the nineteenth century, an estimated 600-700 covered bridges had been built in the state.[5]

Eventually, metal eclipsed timber as the favored material for bridges and the number of covered bridges began to decline as the ravages of time took their toll. The advent of the automobile spurred this decline in the early twentieth century, when many covered bridges were replaced with modern spans. More than 200 covered bridges were lost in the floods of 1927 alone. By 1940, only 180 covered bridges remained in the state.[6]

Although the Vermont Department of Highways had little incentive to preserve covered bridges, especially those on major highways, public sentiment for these structures began to grow during the 1930s and 1940s. Thanks to a number of artists, writers and antiquarians, the public came to view covered bridges as integral features of the rural landscape and symbols of a simpler, more idyllic time, rather than as decrepit eyesores. The work of author Herbert Wheaton Congdon (1876-1965) and photographer Edmund Homer Royce (1883-1963) contributed much to public perception of Vermont's covered bridges in the 1940s.[7]

In 1959, the Vermont State Legislature appropriated funds for preserving covered bridges.[8] By the 1960s, in response to many requests from the public, the Vermont Department of Highways began printing maps showing locations of covered bridges in the state. In 1973-74, nearly 85 percent of the state's covered bridges were listed in the National Register of Historic Place.[9] Since that time, six of those bridges have been lost and at least two have been substantially rebuilt.[10]

Today, Vermont's covered bridges are recognized as important historic resources and many continue to serve the state's transportation network. In 1998, the Vermont Department of Transportation established the Historic Covered Bridge Preservation Committee "to insure that

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[4] Richard Sanders Allen, *Covered Bridges of the Northeast* (Brattleboro, Vermont: Stephen Greene Press, 1957), 50-51.
[5] Edmund Homer Royce, "Covered Bridges of Vermont," *Vermont Life* (Spring 1947), 12.
[6] Aldo Merusi, "Vermont's Covered Bridges," *The Vermonter* 46, no. 1 (January 1941): 22. More than 1,200 bridges were washed away in thirty-six hours on November 3-4, 1927; more than 200 were covered bridges. See www.vermonthistory.org.
[7] While a number of artists and writers were early advocates for preservation of these structures, the work of author Herbert Wheaton Congdon and photographer Edmund Homer Royce (1883-1963) contributed much to public appreciation for Vermont's covered bridges in the mid-twentieth century. See also: Louis F. Flanders, "The Covered Bridges of Vermont," *House Beautiful* (April 1928), 434-435.
[8] Vrest Orton, "Some Vermont Ways: Covered Bridges," *Vermont Life* (Winter 1959), 14.
[9] The majority of covered bridges in Vermont that are not listed in the National Register are privately owned.
[10] Bridges that have been lost or substantially rebuilt since being listed in the National Register include: Henry Bridge (Bennington County), Papermill Village Bridge (Bennington County), Swanton Railroad Bridge (Franklin County), Waterman Bridge (Lamoille County), Bedell Bridge (Orange County), River Road Bridge (Orleans County), Dean Bridge (Rutland County) and Hall Bridge (Windham County).

the historic integrity of Vermont's covered bridges is preserved to the greatest extent possible."[11] Over the last decade, the state's covered bridge population has remained fairly stable, at 100 covered bridges.[12]

DESCRIPTION

Hall Bridge is a single-span Town lattice truss covered bridge on dry-laid stone masonry abutments. The bridge is 120' long, 18' high and 16' wide. The roadway is 12' wide. Clearance is 11'-5". The bridge deck is approximately 20' above river level.

The top and bottom chords are paired 4" x 12" planks. The chords sandwich a lattice web that is 2-$^1/_2$ diamonds high. The lattice is comprised of 4" x 12" wood planks fastened with 2" x 12" oak treenails (pronounced "trunnels"). There are 4" x 12" secondary chords below the top chord and above the bottom chord.

The upper lateral system consists of 6" x 10" tie beams on top of the top chord. There are 4" x 6" crossing braces between the beams. There is an additional set of sway braces between the roof ridge and the secondary chords, while 3" x 8" rafters frame onto the top chord and rise to the ridge of the gable roof. Longitudinal nailers are fastened to the rafters and a standing-seam metal roof is fastened to the nailers.

The deck system consists of transverse floor beams, longitudinal stringers and plank decking. Longitudinal 3" x 7" running boards are nailed to the deck. The deck has a positive camber. The bottom chords are seated on longitudinal bolster beams, which project approximately 10' past the face of the abutments to distribute the abutment reaction forces over a lager area of the lattice. The bolster beams are seated on timber cribbing on concrete seats on top of the original stone abutments.

The exterior of the bridge is covered with unpainted, variable-width shiplap siding, placed vertically on the sides and horizontally on the ends. There are three 2'-0" square window openings on each side of the bridge. The portal openings feature rounded corners and are carefully finished with narrow trim. A replica cast-metal plaque is mounted above each portal with the following inscription: SPEED LIMIT / HORSES AT A WALK / MOTOR VEHICLES / 10 MILES PER HR. The structure retains the narrow width of its predecessor, presumably because of the tight approaches and restricted site lines at each end of the bridge. It is posted for an 8-ton weight limit.

The abutments were originally dry laid, without mortar, using stone and rubble classified as field stone. Both abutments were modified in 1982 to support the present structure by the addition of an 8" concrete slab apron. Currently, one-quarter of the estimated bridge weight of 90+ tons

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[11] See http://www.aot.state.vt.us/ProgDev/Sections/Structures/VermontHistoricBridgeProgram/, accessed August 10, 2009.

[12] This number includes one bridge (#45-06-06) in storage and three bridges (#45-05-02, #45-05-03 and #45-14-09) on the Vermont-New Hampshire border.

bears on each corner of the bridge. The trusses were constructed using Eastern White Pine for most of the structural elements, as well as the exterior siding. Douglas fir was incorporated in critical bridge elements such as the bottom chords, floor joists, and bolster beams.[13]

DESIGN

Ithiel Town was born in 1784, at Thompson, Connecticut, and died at New Haven in 1844. During his youth, Town apprenticed as a carpenter and learned much about the construction trades. In 1804, at the age of 20, Ithiel Town left for Boston, where he studied architecture under Asher Benjamin.[14] While there, he was chosen to make improvements on the Massachusetts State House. Six years later, Town moved to New Haven to begin his career as an architect.

In 1826, Town became associated with New York architect Martin E. Thompson (1786-1877), one of the founders of the National Academy of Design. Three years later, he formed a partnership with colleague Alexander Jackson Davis (1803-1892), with whom he developed the Greek Revival style of architecture. Town undertook major projects, including churches, state capitols and other public buildings.

In 1820 and 1835, Ithiel Town obtained patents for a new system for the construction of wooden bridges that became one of the most widely used bridge trusses of the nineteenth century.[15] Town's revolutionary design consisted of two layers of planks forming a lattice web fastened with wooden pins, or treenails, at each intersection. The lattice functions as a series of overlapping triangles so that the load in any one triangle affects the distribution of stress in all other triangles. Town built, or helped build, as many as fifty wooden bridges himself and aggressively promoted his "Town lattice truss" through agents who sold the rights to use his patent at $1 per foot of bridge.[16]

The simple, sturdy Town lattice truss was used extensively for bridges well into the twentieth century. Its popularity was based on a number of factors: it used small, easily procured lumber; it required a minimal amount of intricate framing, allowing for easy erection by carpenters of even modest ability; it could span up to 200'; and it showed stress long before collapse occurred. Thousands of Town lattice truss bridges were built in the nineteenth and early twentieth century, and there are about 150 surviving examples in the United States, primarily in the Northeast.

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[13] "Damage assessment for the Hall's Covered Bridge," letter from Tim Andrews to Tim Cullenen, September 6, 2011.
[14] Richard D. Carreno, *Ithiel Town: An American Original* (Thompson, Connecticut: Thompson Historical Society, 1995), 3.
[15] Ithiel Town, United States Letters Patent, 20 January 1820.
[16] Roger Hale Newton, *Town & Davis Architects* (New York: Columbia University Press, 1942), 73-74.

HISTORY

The availability of extensive waterpower along Saxtons River between Bellows Falls and Cambridgeport, Vermont, encouraged settlement of this area. The first settlers arrived in 1783 and, by the early 1800s, a small hamlet had grown around the several industries established there. With the addition of hotels, stores, livery and a blacksmith shop, the hamlet became an important stagecoach stop on the major thoroughfare across southern Vermont. Saxtons River Village was incorporated in 1820.

There *may* have been a bridge at this site by 1856, when the crossing appears in *McClelland's Atlas of Windsor County, Vermont*, but no written records have been found concerning such a structure. Bellows Falls contractor Sanford Granger (1796-1882) reportedly built the first covered bridge here in 1867.[17] That bridge was commonly referred to as Osgood Bridge. It was named for Saxtons River native Holland W. Osgood (1834-1916), who owned the adjacent property in the late nineteenth and early twentieth century. Sometime prior to 1920, Webster Hall (1871-1971) purchased the Osgood property and the crossing became known as "Hall Bridge."[18]

The 1867 covered bridge carried travelers for well over a century. In the early twentieth century, the span routinely carried heavy volumes of traffic to and from Barber Park, a local amusement park and picnic ground.[19] By 1937, Hall Bridge was infrequently used, but was locally recognized as an historic landmark.[20] Hall Bridge was listed in the National Register of Historic Places in 1973.[21]

On October 2, 1980, a construction worker attempted to cross Hall Bridge with a fully-loaded gravel truck. Although the driver escaped, both the bridge and the truck ended up in the river.[22] The Town of Rockingham held Farnsworth Construction Company liable for the damages and settled with their insurance company for $99,750.[23] On October 20, following some debate on whether to rebuild the damaged structure or replace it with a new span, the Rockingham Board of Selectmen voted to replace the Hall Bridge *"with another bridge of the same type."*[24] The

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[17] In addition to building residences, schools, industrial and commercial structures, Sanford Granger was known for building covered bridges, including the Tucker Toll Bridge (1840-1873) across the Connecticut River. Two extant covered bridges in Rockingham are attributed to Mr. Granger: Worrall Bridge (1868) and Bartonsville Bridge (1870).

[18] One of the earliest written references to Hall Bridge is the *Brattleboro Daily Reformer's* 1937 publication, *The Story of Covered Bridges in Windham County*.

[19] In 1900, Saxtons River musician Calvin L. Barber (1843-1900) donated property $^1/_2$ mile east of the bridge to the Bellows Falls & Saxtons River Street Railway for development of a public recreation area. Barber Park featured terraced gardens, a dance pavilion, a theater, tennis courts, a playground, a polo field and a zoological park. Barber Park was used until 1924, when the railway ceased operations and the property reverted to Calvin Barber's heirs.

[20] *The Story of Covered Bridges in Windham County, Vermont* (Brattleboro, Vermont: Brattleboro Daily Reformer, 1937), 29.

[21] Hugh H. Henry, "Hall Bridge," National Register of Historic Places Nomination, 1974.

[22] Barbara Nagy, "Farnsworth Held Liable for Damages," *Bellows Falls News-Review*, October 9, 1980, 1.

[23] "Bridge Settlement Accepted," *Bellows Falls News-Review*, December 4, 1980, 1; Barbara Nagy, "Hall Bridge Settlement Expected Today," *Bellows Falls News-Review*, November 13, 1980, 1.

[24] Town of Rockingham, *Selectmen's Records*, Book 147, October 20, 1980, 111

town contracted with Milton Graton of Ashland, New Hampshire, to build a new covered bridge on the old abutments for $124,000.[25]

CONSTRUCTION

Written records of how nineteenth-century covered bridges were built are scarce, and details varied from region to region. The few records that have been found to date suggest that it was common practice to frame covered bridges in a field near the bridge site. Once framed, a span would be disassembled and reassembled over the river on falsework.[26] The construction of Hall Bridge followed this tradition, except the builders used their special skills as riggers to draw the completed bridge out across the river, again on falsework.

The Gratons used no blueprints; instead, the builders relied on examination of the previous structure and then increased the dimensions of the members, including the bottom chords, lattice planks, treenails and deck planks.[27] With these rough specifications in mind, the next item of business was to obtain lumber, mill it and allow it sufficient time to dry. Different species were chosen for their availability and varying degrees of strength and flexibility: Douglas fir for the chords, pine for the lattice, oak for the treenails and spruce for the deck.[28]

Construction began in the winter of 1981 and continued through the summer of 1982. The 120' trusses were framed in a field adjacent to the bridge site, using traditional joinery and 1,000 hand-made treenails. The framed trusses were then lifted upright with gin poles and plumbed on temporary timbers. Floor beams were installed and the deck fastened on top. The rafters and upper lateral bracing were then plumbed from the deck. Finally, the siding and metal roofing were fastened in place.

A wooden track was built across the river on cribwork. The bridge was then jacked to the required height and a series of rollers placed underneath. Due to the roadway layout, final placement of the structure required pivoting the bridge on rollers until it was in a straight line with the abutments. Over the course of five days in late July and early August, a team of oxen hauled the completed bridge out across the river. The oxen walked around a capstan connected to a block and tackle that gave them a 90:1 mechanical advantage and allowed them to pull the 135,000-pound structure a few inches during each complete turn.

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[25] Annmarie Janenko Christensen, "A Bridge to the Past," *Burlington Free Press (Vermonter)*, August 8, 1982, 3. Other sources state the cost was $127,000 or $129,000.
[26] David Stevenson, *A Sketch of the Civil Engineering of North America*, 1938.
[27] Sally Anderson, "Thousands Flock to See Hall Covered Bridge," *The Shopper* [Bellows Falls, Vermont], August 4, 1982, 10.
[28] "Covered Bridge Craftsman Speaks in Saxtons River," *Bellows Falls News-Review*, April 22, 1982.

On July 31, the Saxtons River Historical Society held a bridge dedication ceremony attended by several hundred people. In honor of the occasion, local resident Walter H. Thompson penned the following poem: [29]

Hall Bridge, 1982
Through snow and rain and scorching summer sun,
A covered bridge a friendly purpose serves.
Connecting river banks, a crossing won,
It welds a neighborhood, good will preserves.
A passage and a shelter it provides.
Its seasoned timber, fragrant of the trees
Grown tall in sun and rain on green hillsides,
When joined by skillful hands, all crossers please.
Pedestrians, a horse, oxen or car
Enjoy its pleasant shade, restricted speed.
Both native folk, or tourists from afar,
Upon its special virtues are agreed.
The old bridge served a hundred years and more.
May this one, too, attain at least five score!

Hall Bridge was opened to traffic on September 16, 1982 and has remained in service since that date. [30] The one-lane bridge is currently posted for 8 tons and trucks are encouraged to use the Barber Park Road Bridge $^{1}/_{2}$ mile downstream.

BUILDER

Milton S. Graton (1908-1994) was born in Connecticut but lived much of his adult life in New Hampshire. His father, Austin Gratin (1870-1964), was a carpenter who specialized in building and moving timber-frame structures, and Milton apprenticed with him as a young man before starting his own rigging and contracting business. In 1954, while salvaging timber from a collapsed covered bridge, Graton was impressed with the quality of workmanship in the structure and subsequently sought out other jobs involving covered bridges.

Milton's son, Arnold M. Graton (b.1937), began working with his father in 1958. Together, they became specialists in the restoration and building of covered bridges. They built, repaired or restored more than fifty covered bridges using traditional materials and framing techniques. Arnold M. Graton and his son, Arnold Jr., still carry on the family business, Arnold M. Graton Associates, Inc. Hall Bridge is one of nine authentic new covered bridges built by Graton Associates between 1965 and 1994. [31]

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[29] Joan Campbell, "Hall Covered Bridge Dedicated in Saxtons River," *Bellows Falls News Review*, August 8, 1982, 11.
[30] "Hall Bridge Open," *Bellows Falls News-Review*, September 16, 1982, B6.
[31] See http://arnoldmgraton.com, accessed September 2009.

HURRICANE IRENE DAMAGE

On August 28, 2011, Hurricane Irene caused flooding to record levels in the State of Vermont, damaging hundreds of bridge crossings, including several covered bridges. According to USGS readings at the site, 14,700 cubic feet of water/second flowed on Saxtons River under Hall Bridge during peak flooding. After the storm, the Town of Rockingham consulted with timber framer Tim Andrews of Barns and Bridges of New England to assess the damage and subsequently hired him to repair the bridge. What follows is a condensed version of his reports submitted to the Town of Rockingham.

The southwestern abutment was severely damaged by high water and floating debris. After the storm, an area of stone measuring 6' tall, 6' wide and 6' deep was dislodged and deposited downstream. The large section of stone removed by the flooding left the thin concrete cap above vulnerable to failure in tension. The high water and floating debris also dislodged the timber bolster beam which supports one-quarter of the bridge's dead weight. Prior to emergency measures taken on Tuesday, August 30, 2011, the bridge was in imminent danger of collapse and near total destruction.

The upstream (northwest) truss sustained damage to two of the truss's lattice planks. The section below the bottom chord known as "drops" or "relish" was severed from the affected plank. Several other lattice "drops" sustained abrasion but had no adverse structural affect. In addition, a 6"-diameter section of a tree was lodged between the two bottom chords of the upstream truss, spreading apart the connections between the adjacent lattice plank as well as the twin laminations of the third chord. Approximately 40 percent of the total length of 122' of the upstream siding needed repair. Even the metal roof of the bridge suffered damaged, presumably from floating debris riding up the roof, bending the lower, drip edge.[32]

The bridge was closed following the storm, and Andrews repaired the bridge in October-November 2011. Working from a structural design by H.E. Bergeron Engineers, Andrews installed temporary support towers about 20' from the damaged abutment, jacked the bridge $^{3}/_{8}$" to relieve stresses and replaced the two damaged lattice planks and six treenails. He also procured and milled 40 linear feet of new Eastern White Pine cladding and let it dry for two months prior to replacing the damaged siding.[33]

To repair the southwest abutment, Andrews used a combination of recovered stone, supplemented with like quality stone. He identified and recovered a 2,500 pound stone about 250 yards downstream of the bridge and returned it to its original location. He used HAER large-format photographs from 2009 to help him match the missing stone. The stones were secured with structural grout and $^{1}/_{2}$" galvanized chain attached to expansion bolts, solidifying the new and old work. The metal roof was repaired and bent back to near new condition,

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[32] "Damage assessment for the Hall's Covered Bridge," letter from Tim Andrews to Tim Cullenen, September 6, 2011.
[33] "Progress Report," letter from Tim Andrews to Tim Cullenen, November 7, 2011.

keeping water from reaching the fascia boards. The bridge was reopened on November 23, 2011, less than three months after the hurricane.[34]

[34] "Progress Report," letter from Tim Andrews to Tim Cullenen, November 30, 2011.

ILLUSTRATED APPENDIX

Figure 1. Original Hall Bridge after collapse due to overweight truck, 1980. Photo by Jack Peters.

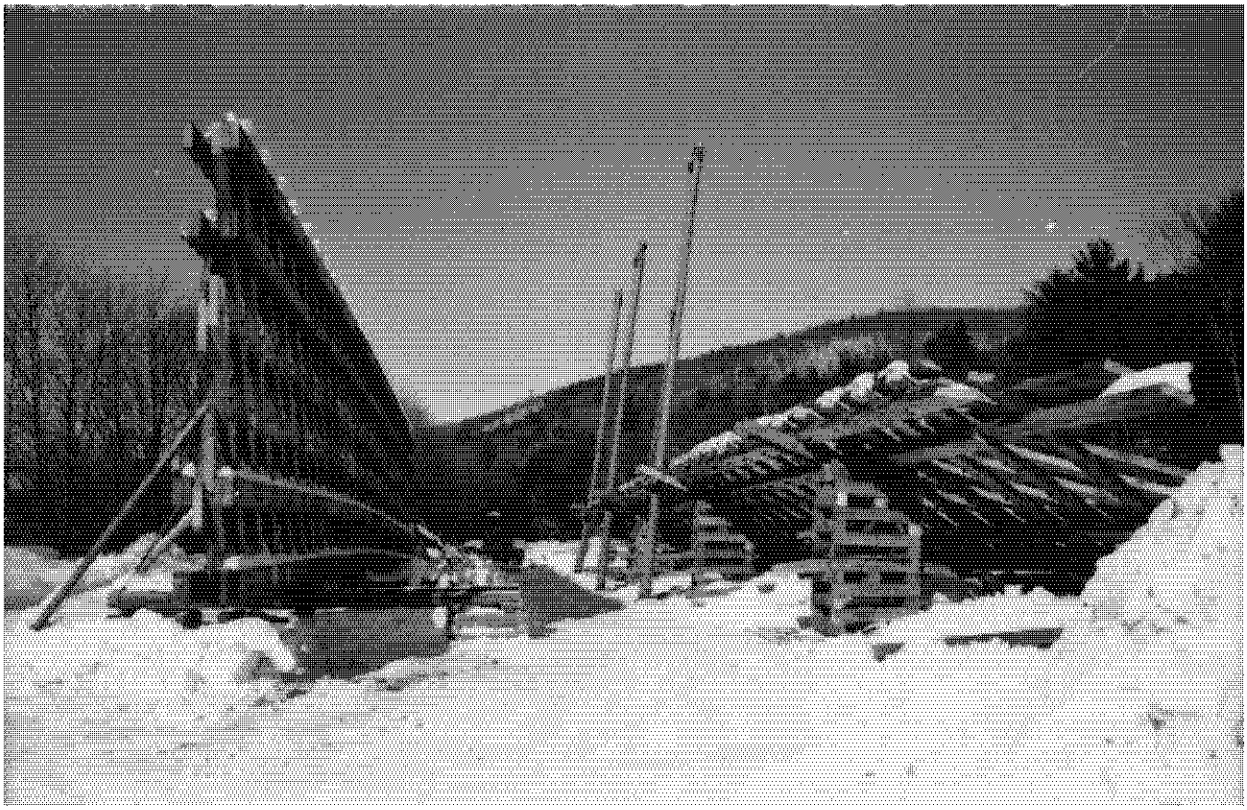

Figure 2. Graton Associates erected each Town Lattice truss separately in a neighbor's field. Photo by Jack Peters, 1982.

Figure 3. Completed truss with rafters ready for sheathing and roofing. Photo by Jack Peters, 1982.

Figure 4. Graton Associates erected cribbing to support timber rails prior to rolling the bridge. Rail had to be set at a different angle because of house at the east end of the bridge. Photo by Jack Peters, 1982.

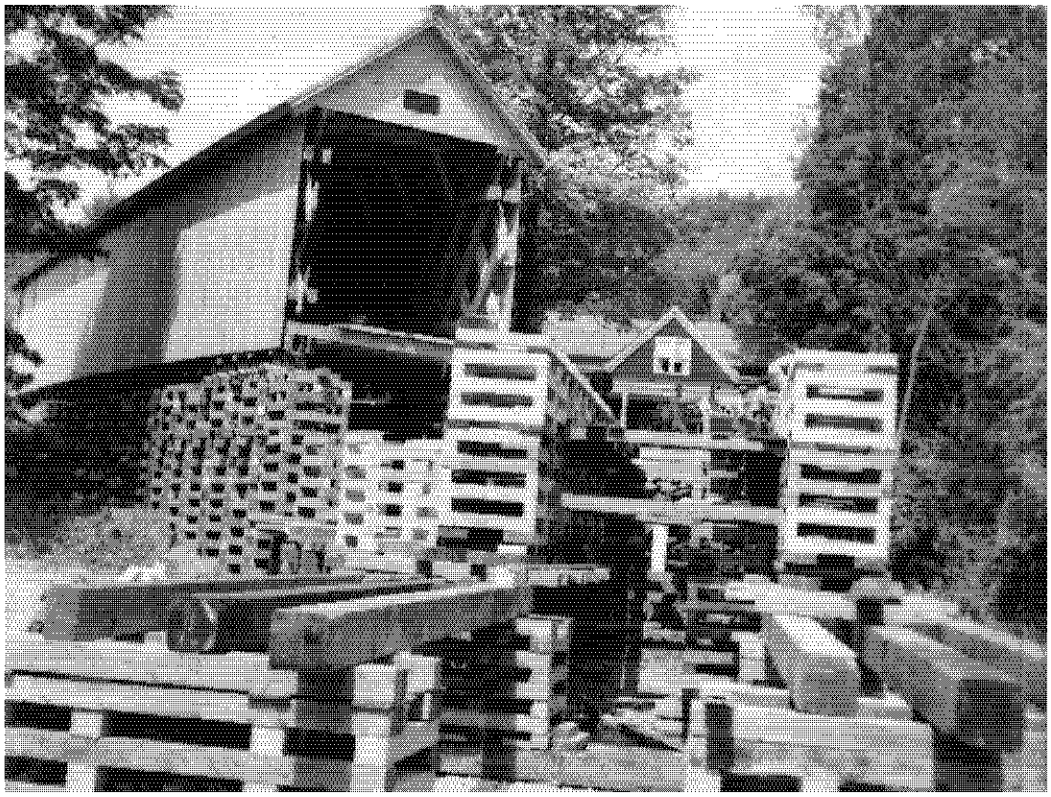

Figure 5. Bridge begins its journey across the approach track. Photo by Jack Peters, 1982.

Figure 6. Milton Graton feeding rope from the capstan. Photo by Jack Peters, 1982.

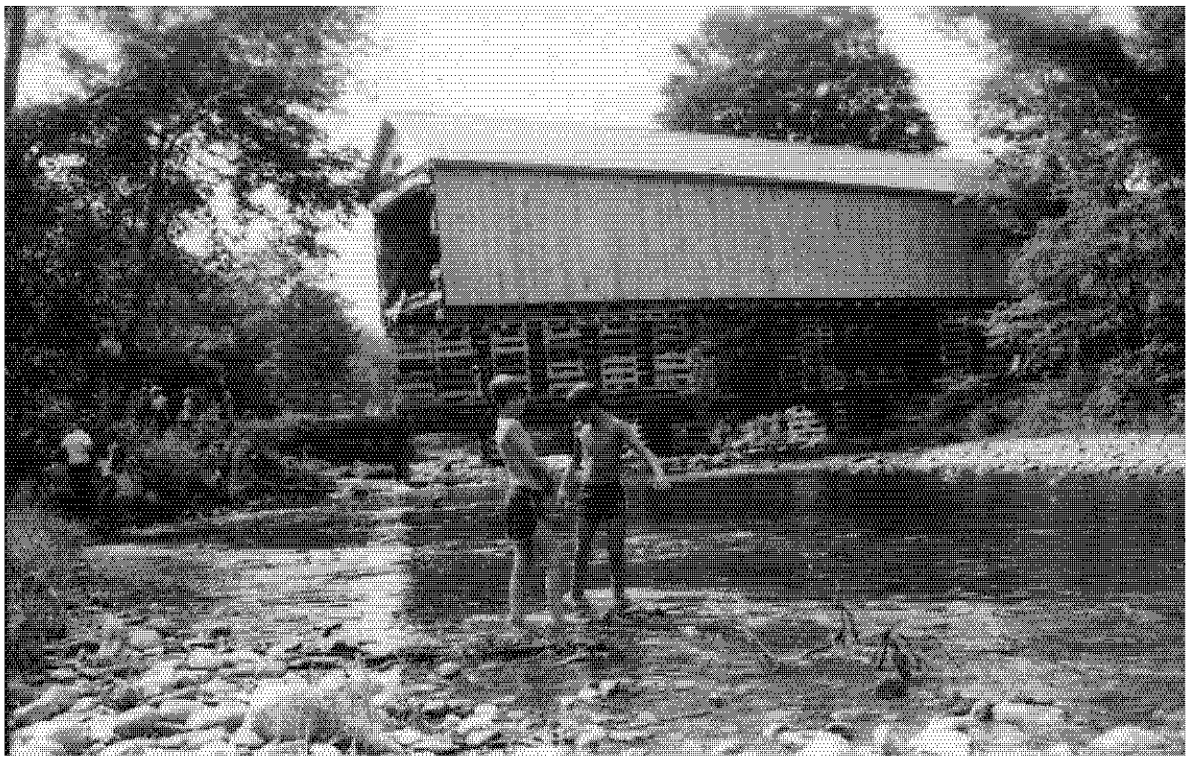

Figure 7. Bridge over half way across Saxtons River. Photo by Jack Peters, 1982.

Figure 8. Oxen and capstan after moving bridge across river. Photo by Jack Peters, 1982.

Figure 9. Hurricane Irene flooding of Saxtons River threatens Hall Bridge on August 30, 2011. Note water scouring the southwest abutment and debris piercing the siding. Photo by Aurelius Dibernardo.

Figure 10. View of underside of bridge following hurricane, showing missing stone in corner of south-west abutment, dislodged bolster beam, and tree damage to truss. Photo by Will Truax, September 2011.

Figure 11. Detail of missing stone and dislodged bolster beam, which has been pushed out beyond the bridge face during jacking. Photo by Will Truax. September 2011.

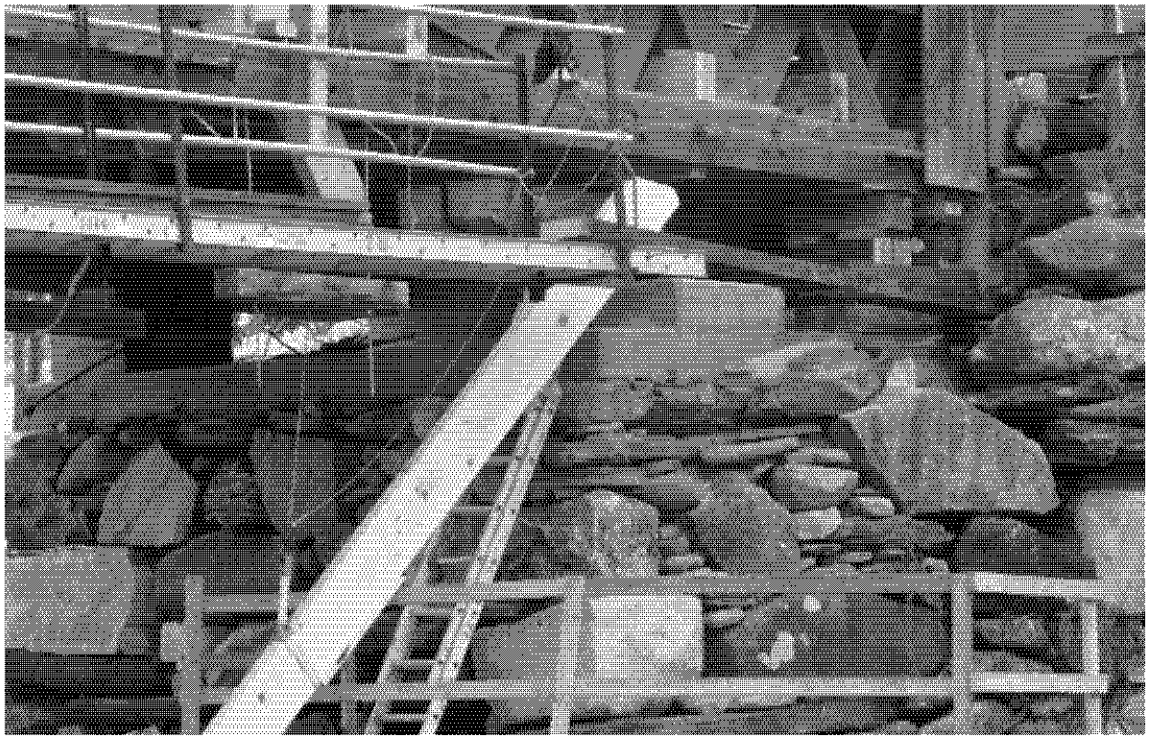

Figure 12. Detail of repaired stone and bolster beam. The large white stone at the southwest corner (center, behind railing), weighing 2,500 lbs, was found 250 yards downstream and returned to its original position. Photo by Tim Andrews, November 2011.

Figure 13. Elevation of bridge showing temporary support and installed new lattice plank, with second plank being prepared to set into place and repaired abutment. Photo by Tim Andrews, November 2011.

Figure 14. Rehabilitated bridge with new siding on southwest end. Photo by Will Truax, November 2011.

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