Town Lattice Covered Bridges
Regional Variations

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• Acknowledgement to Joseph D. Conwill
• Truss Issues
• Ithiel Town Background
• Town’s Patents
• Town’s Papers
• Town Lattice Distribution
• Variations
  ▪ Truss Variations
  ▪ Bridge Variations
• Summary
• References
Truss Issues

- Sweep (Twisting or Curving in the Direction of Their Length)
- Racking (Leaning Sideways)
- Chord Buckling
Truss Issues

Pre-Rehabilitation
Comstock Covered Bridge (Built 1883) – Montgomery, VT

Post Rehabilitation
Green River Bridge (Built 1870) – Guilford, VT
Hutchins Covered Bridge (Built 1883) – Montgomery, VT
Truss Issues

Chord Buckling

Hutchins Covered Bridge (Built 1883) – Montgomery, VT
Truss Issues

Chord Buckling

*Scott Covered Bridge (Built 1870) – Townshend, VT*
Truss Issues

Chord Buckling

Scott Covered Bridge (Built 1870) – Townshend, VT
Ithiel Town Background

- Ithiel Town (1784-1844)
  - October 3, 1784 - Born in Thompson, CT
  - 1792 - Moved to Cambridge, MA to Live with an Uncle
  - 1812 - Moved to New Haven, CT. Works as Builder/Architect.
  - 1818 – First Bridge – Yadkin River Covered Bridge, Salisbury, NC
  - 1819-20 – Cape Fear Bridge – Fayetteville, NC
    - Likely Fully Developed Example of Town Lattice

Ref. 9 - Sanders, John L.
Ithiel Town Background

- Ithiel Town (1784-1844)
  - January 28, 1820 – First Town Lattice Patent
    - $1/Foot for Use; $2/Foot if Used Without Permission
  - 1825 – Establishes Office In New York City
    - Connecticut State Capital
  - 1829 – Begins Six year Partnership w/Alexander J. Davis
    - North Carolina State House – Raleigh – Redesign
    - Spends Time in Europe
  - April 3, 1835 – Second Town Lattice Patent Granted
  - June 12 or 13, 1844 – Buried in Grove Street Cemetery, New Haven, CT

Ref. 9 - Sanders, John L., Trinity Episcopal Church
• Original Patent
  - Granted January 28, 1820
  - Single Upper and Lower Chord in Drawing; Double Mentioned in Text
  - “..of about 45 degrees or any angle that may be necessary for a brace..”
• Original Patent
  ▪ “..after which secure all joints by 1, 2, 3 or more trunnels or iron bolts with wedges to the trunnels and heads and nuts to the bolts to keep the parts of each joint in close contact.”

Trunnels with Wedges – Haverhill-Bath, NH Covered Bridge
(Built 1827-1829)
Town’s Patents

• Original Patent
  ▪ “..after which secure all joints by 1, 2, 3 or more trunnels or iron bolts with wedges to the trunnels and heads and nuts to the bolts to keep the parts of each joint in close contact.”
“A Description of Ithiel Town’s Improvement in the Construction of Wood and Iron Bridges” – 1821

Expands Upon 1820 Letter Patent
- One or Two Lanes and Sidewalks
- Two Trusses – Suspension Post in Center
- Floor beams on Upper, Lower Chord
- Plank – 10” or 11” Wide, 3-3-½” Thick
- Plank – Sawed from White Pine or Spruce
- Trunnels – 1-½” Diameter White Oak
Ref 12 – Figure 1, 2, 3

Ref 12 – Figure 4, 5
• “A Description of Ithiel Town’s Improvement in the Construction of Wood and Iron Bridges” – 1821
  
  “For any span or opening not exceeding one hundred and thirty feet, one string-piece at top and one at bottom of each truss, if of a good proportion and well secured, will be sufficient, (see Fig. 2;) but as the span is extended beyond one hundred and thirty feet, two or more at top and bottom would be required as shown in Fig. 1....”

  “Very flat pitched roofs will be preferable, as it will, in that case, be a greater support to the upper part of the bridge.”
Town’s Papers

“Some Account and Description of Ithiel Town’s Improvement in the Construction and Practical Erection of Bridges, Aquaducts and Rail Road Bridges, Whether Built Entirely of Wood or Cast or Wrought Iron” – 1831

- Built Bridges
  - Northampton, MA – 1,080 Feet Long
  - Over the Susquehannah River – 2,200 Feet Long (220’ Spans)
  - Others in NH, CT, NJ, RI, PA, VA, NC, SC
“Some Account ..” – 1831

- “...I have been enabled, from constant practice, to make many improvements in the principle, and in the arrangement of the materials. Consequently, the pamphlet originally published, is defective in many respects; so much so, as not to be a proper guide...”

- 12 Advantages for this Mode
  - No Abutment Lateral Pressure, Availability of Material, No Iron Work Required, Load Distribution, Lower Cost, Stronger Joints
• ‘Improved Patent’
  - Granted April 3, 1835
  - “…What I claim is the improvement is the addition of another similar set or series of bracing of similar kind and dimensions, to be placed in a similar manner, either directly opposite to the former; or in any manner so as to bring the second tier not opposite of the former; but so that all the intersection of the braces of the latter series shall fall between those of the former braces on the horizontal string pieces; after which, another string piece is to be formed similar to the others at the top and bottom…”
“A Description of Ithiel Town’s Improvement in the Principle, Construction and Practical Execution of Bridges, Roads, Railroads, and Aquaducts Whether Built Entirely of Wood, or of Cast or Wrought Iron” – 1839.

- “..and to be far more secure against its trusses twisting, leaning sideways, or curving in the direction of their length.”

Town’s Papers
**Town Lattice Distribution**

- 143 Extant Town Lattice Covered Bridges in the US
- 81 In Quebec Canada (69 Town Variants)

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Town Lattice Distribution

- 143 Extant Town Lattice Covered Bridges in the US

Base Map Source
Variations

- Town Truss Variations
  - Single Upper Chord
  - Square Lattice Members
  - Triple Lattice
  - Quad Lattice
  - Quebec Variations
  - Splayed Lattice
  - Railroad Bridges
Variations

- Town Bridge Variations
  - Built-In or Added Arches
  - Metal Splice Clamps
  - Outriggers
  - Sidewalks
  - Roof Framing
Truss Variations

Single Upper Chord

Beaverkill Covered Bridge (Built 1865) – Rockland, NY
Truss Variations

Square Lattice Members

Cornish-Windsor Covered Bridge (Built 1866) – NH/VT
Truss Variations

Square Lattice Members

Cornish-Windsor Covered Bridge (Built 1866) – NH/VT
Truss Variations

Square Lattice Members

Orford-Fairlee Covered Bridge (1856-1936) – Photo Courtesy George Pease Collection, NSPCB
Truss Variations

- Rare Variant - Three Layers of Lattice
- Unbroken Pattern of Lattice from End to End

Cowlesville Bridge over Cayuga Creek, Wyoming County, New York (32-61-01)
Built 1874, Lost to Arson 1966 – NSPCB Archives Richard Allen Collection
Truss Variations

**Triple Lattice**

Cousineau Bridge over Brandy Creek at Valcourt (Built 1888) (61-66-02)
Photo Courtesy Jack Schmidt – 6-30-11
Truss Variations

Quad Lattice

Zumbrota Covered Bridge (Built 1869) – MN
Photo Courtesy: http://www.alpsroads.net/roads/mn/zumbrota/
Truss Variations

- Quebec Colonization Bridges
- ‘Standard Design’ Used Until the 1950’s
- No Connections Between Lattice, Verticals Added at Crossbeams
- Lost Cousin in VA?
Truss Variations

Pont Balthazar, Farnham Quebec (Built 1932) – 11/12/2007
Photo Courtesy William Caswell, Jr.
Truss Variations

Hureault, Quebec (Built 1955, Lost 1983) – Photo from 1973
Photo Courtesy Richard Roy
Truss Variations

Quebec Variations

http://www.360cities.net/image/interior-bridge-wakefield-quebec#16.88,-0.33,100.0

Photo Courtesy William Caswell, Jr.
Truss Variations

Trent’s Mills Bridge (Dates Unknown) – Buckingham County, VA
Photo Courtesy William Caswell, Jr.
Truss Variations

Splayed End Lattice

Beaverkill Covered Bridge (Built 1865) – Rockland, NY
Truss Variations

Railroad Bridges

Ref: “A History of the Development of Wooden Bridges” - 1932
• Fisher Bridge – Wolcott, VT
• Built in 1908 - Unique Full-Length Cupola
Truss Variations

Railroad Bridges

Fisher Covered Bridge (Built 1908) – Wolcott, VT
Truss Variations

Railroad Bridges

Pier Covered Bridge (Built 1907) - Newport, NH
Pier Covered Bridge (Built 1907) - Newport, NH
Photo Courtesy William Caswell, Jr.
Bridge Variations

Built-In or Added Arches

Oldest Remaining Town Lattice Truss (Built 1827-1829)

Haverhill-Bath, NH Covered Bridge (Built 1827-1829)
Bridge Variations

Built-In or Added Arches

Wright’s Bridge (Built 1906) – Newport, NH
Fisher Bridge – Wolcott, VT

Ref: “A History of the Development of Wooden Bridges” - 1932
Bridge Variations

Beaverkill Covered Bridge (Built 1865) – Rockland, NY
Bridge Variations

Outriggers

Scott Covered Bridge (Built 1870) – Townshend, VT
Bridge Variations

Outriggers

Cresson Covered Bridge (Built in 1859) – Swanzey, NH
Haverhill-Bath, NH Covered Bridge (Built 1827-1829)
Bridge Variations

Sidewalks

Ashuelot Covered Bridge (Built 1864) – Winchester, NH
Bridge Variations

Sidewalks

Thompson Covered Bridge (Built 1832) – Swanzey, NH
Bridge Variations

Cousineau Bridge over Brandy Creek at Valcourt (Built 1888) (61-66-02)

Photo © Dale Travis – Photo by Jack & June Schmidt – 6-30-11
Summary

- Ithiel Town (1784-1844)
  - 2 Patents, Multiple Papers
  - Improvements Made to Design
- Popular Truss Type, Economical to Construct
- Some Designs Can be Subject to Rack and Sweep
- 143 Town Lattice Covered Bridges in U.S. – 81 Quebec
  - Only Eight West of the Mississippi River
- Multiple Variations to Truss and Bridge
References


11. Town, Ithiel. 1820 Letter Patent


13. Town, Ithiel. “Some Account and Description of Ithiel Town’s Improvement in the Construction and Practical Execution of Bridges, Aqueducts and Rail Road Bridges, Whether Built Entirely of Wood, or of Cast or Wrought Iron”. New York, 1831,
