The Second National Covered Bridge Conference

Dayton, Ohio
June 5-8, 2013

The Historic Eldean Covered Bridge

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Old Red Covered Bridge
Special Meeting

Letting of River and Canal Bridges.

Troy, April 13, 1860

The Commissioners met at the Auditor's Office for the purpose of receiving and examining bids for the several bridges advertised for letting—all the members present.

A large number of bidders were present, and an immense number of bids were received. The time for the receipt of bids having elapsed, the Board proceeded to examine those received and award the contracts.

Allen's Mill Bridge

The Bridge across the Miami River at Allen's Mill was awarded to Messrs. J. H. M. Hamilton as follows:

For stone work on abutments, everything by contractor, and no extra charge for two dollars and seventy-three cents per twenty-five cubic feet, and for per ton Ninety-five cents per ton.

For superstructure of Bridge—to be on according to specifications exhibited, file in the Auditor's Office—eleven seventy-five cents per foot upright.

Greenville Creek Bridge

as follows: at two dollars and twenty cents per hundred of twenty-five cubic feet.

Bridge Built in 1860
Old Allen’s Mill

COURTESY OF THE TROY HISTORICAL SOCIETY
Stephen H. Long
Long’s Wedge
Bridge After Rehabilitation
Eldean Covered Bridge - c1933
Eldean Covered Bridge - 1932
Steel Rods & Steel Members
This portion of the metal roof and roofing nails, which were installed over the original wood shingles, were removed from the Eilean Covered Bridge. The metal roof was installed in 1936 by Roy Wilt, Hayes Wilt, Jim Covault and Bill Smith, all from Fletcher, Ohio.

Material cost $235, labor cost $45.
Repairs to Siding by County Forces
Bridge After 1976 & 1977 Repairs
ELDEAN BRIDGE
(Allen's Mill Bridge)
Spanning the Great Miami River
Troy Vicinity, Ohio

Long Truss, 1860

The Eldean Bridge is one of the best surviving examples of a Long Truss, patented in 1830 by Col. Stephen H. Long of the United States Army Topographical Engineers. The Long truss features diagonal compression members and vertical tension members and is considered the first scientifically designed bridge truss type because the forces in the members can be determined mathematically, where earlier bridge trusses had been designed by empirical method. Central to Long’s patent was the concept of driving wedges into the connections, which prestressed the structure, ensuring that the compression and tension members functioned efficiently. Long was the last of the three partners to build the Eldean Bridge. At 218’ 10” span, the two span Eldean Bridge is the second longest bridge in Ohio.

The National Covered Bridges Recording Project - Phase I was undertaken during the summer of 2002 and is part of 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 the Historic American Buildings Survey/Historic American Engineering Record (E. Blaine Cliver, Chief), a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project. The Miami County Engineering Department (Doug Christian, Chief) and David Simmons (Ohio Historical Society) provided assistance at the Eldean Bridge.

The field work, measured drawings, historical report, and photography were completed under the direction of Eric DeLong, Chief of HAER, Christopher Marston, Project Leader, and Richard O’Connor, HAER Senior Historian. The field team consisted of Field Supervisor Naomi Hernandez (Pratt Institute), Architect Kimberly MA), and Sarah Dangelas (U. of Maryland), Dr. Dario Gasparini, P.E. (Case Western Reserve U.), and Dr. Ben Schafer, P.E. (Johns Hopkins U.), served as engineering consultants. Large-format photography was produced by Jet Lowe.

Built in 1860 near the site of Henry Allen’s flour mill (est. 1848) and Eldean Station on the B&O branch line between Troy and Piqua, the Eldean Bridge is the second bridge to span the Great Miami River at this site. The contractors were John and William Hamilton, stone cutters and quarry owners from the neighboring town of Piqua. The bridge was completed in the fall of 1860 at a total cost of $4,000.83.
Structural Concept

"...A system of counter bracing, by means of which the truss frames are rendered stiff and unyielding, and the bridge kept in uniform action, whether loaded or unloaded ..."

"The splices should always occur at points as remote as practical from the points of greatest tension in the springs, (chords) which are situated at the center of the span, for the lower strings. They should also be located about midway of the panel in which they occur."

- Patent granted to S.H. Long, 1830.

Abutment Condition

In the original bridge design the ends of the lower chords were seated on wood sills, usually only an extra piece or two of wood, on top of the stone abutments and piers. As the wood decayed, the ends of the chords were inserted every foot into the stone to protect the wood from decay. The bridge is still in excellent condition because of the continuous use of this method of construction. This method has been successfully used on a number of other bridges throughout the United States, including the bridge at the Willamette Valley, Oregon, and the bridge at the Puget Sound, Washington.

HAER Drawing with Structural Details
Bridge Prior to Rehabilitation
Bridge Interior Prior to Rehabilitation
James Barker's General Plan for Bridge Rehabilitation
Driving Piling at Beginning of Rehabilitation
Repair During Winter
Repair During Early Fall
New Metal Roof
Interior After Rehabilitation
Bridge After Rehabilitation
Strain Gauge
Installed Strain Gauge
Flooding
Ice Jam Upstream @ Farrington Covered Bridge
15” I- Beams at East Abutment
2004 Fire Damage to Roof & Rafters
Sheared Verticals @ Southeast Corner of Bridge
Interior & Exterior Lighting
Video Surveillance Camera
Existing Eldean Covered Bridge