

Renwick Road Bridge
Carrying Renwick Road
Over the DuPage River
Plainfield Vicinity
Plainfield Township
Will County
Illinois

HAER No. IL-123

HAER
ILL
99-PLAIN.V,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Denver, Colorado 80225-0287

HISTORIC AMERICAN ENGINEERING RECORD
RENWICK ROAD BRIDGE
HAER No. IL-123

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I. INTRODUCTION

Present Location: Renwick Road
Spanning DuPage River
One and one-half miles southwest
of Plainfield, Illinois

USGS Quadrangle: Plainfield, Illinois
Latitude 41°-35.54'; Longitude 88°-13.46'
UTM 16.4605000.3979362

Inventory Data: Renwick Road Bridge
(Township Highway)
Illinois Structure No. 099-3120
NE 1/4 of Sec 20, T36N, R9E
Will County

Date of Construction: 1912, accepted date, possibly earlier

Owner, Custodian: Plainfield Township Highway Department

Present Use: Vehicular bridge programmed for replacement
in 1996.

Significance: This single-span bridge, located near a
historic site on DuPage River is a through
Pratt truss, 151 feet in length, the last
surviving through truss in Will County, and an
example of a bridge type once familiar in
Illinois. This truss, built by the Wrought
Iron Bridge Company, is one of three spans in
the state known to have been built by this
prolific Canton, Ohio, builder. Pin-connected
Pratts were a common late 19th and early 20th
century metal truss design which is vanishing
from the American landscape.

Historian: John B. Nolan, S.E.
15 August 1995

II. HISTORY

The DuPage River in northeast Illinois is a tributary of the Illinois River, draining the former wetland area west of Chicago, it flows generally southwestwardly and parallel to the Des Plaines River. After the drifting of Indians from the area and the closing of the nearby DuPazhe fur trading post, the first Anglo-Americans to settle permanently were James Walker and his father-in-law Reverend Jesse Walker, a former missionary to the Indians; they arrived in 1830 and the settlement around James Walker's cabin, known as Walker's Grove, became the predecessor of Plainfield.¹

Timber was abundant in the area, and by 1832 James Walker had built a sawmill on the DuPage River, a mile and a half below his home and about 500 feet south below the point where the river road forded the river. Lumber sawed by this mill was hauled to Chicago by a team of oxen to build one of the first frame buildings in that village. Until a flood destroyed the dam in 1838, Plainfield and the surrounding towns used all the lumber the mill could produce. After the flood the mill was not rebuilt and the flat cleared land was adapted to agriculture.²

A post office was established in Walker's Grove in 1833, but when the town was subdivided in 1834 by Chester Ingersoll the name was changed to Plainfield. James Walker served in the Illinois General Assembly and died in 1851.³

Although the locally accepted date of construction of the bridge is 1912, the truss details incorporate practices common in the 1880s and 1890s. An early photo of the bridge identifies the location as Springbank, a name not familiar to local historians but which may have indicated the natural high bank of the River Road east approach as distinguished from the lower fording location nearby on the north.⁴

The crossing road, currently named Renwick Road, one time southern limit of Plainfield's suburban spread, continues east to Renwick Lake, two miles distant. The lake is named for Mr. Frank W. Renwick, one of the three founders of Chicago Gravel Company which, in 1913, developed gravel pit operations to supply ballast for railroads. Excavation ceased in the 1950s and the lake, now protected, is a rookery for egrets, herons and cormorants.⁵

III. THE BRIDGE

A. The Bridge Type

The main span of the Renwick Road bridge is a simple span through Pratt truss, a type of truss favored by bridge designers in the closing years of the 19th century.

The development of trusses of wrought iron in the first half of the nineteenth century and steel in the second half, contributed to the rapid expansion of railroads, settlement and industrialization of a growing America. Pratt trusses with pinned connections were the practical and cost effective bridge type for local roads.

Members of early trusses were assembled with rivets in one of the hundreds of small fabrication shops, transported to the site by railroads and wagons and erected by a crew of local laborers under the direction of the manufacturer's representative. There were few standards and many companies developed and patented designs which allowed them to build unique, if not better, bridges.⁶

By the turn of the century, national quality standards were being developed, and many smaller bridge companies ceased operations or merged into larger companies, principally the American Bridge Company. A report of the first Illinois Road Commission in 1906 urged uniformity in design and the development of experienced contractors.⁷

The early lightweight Pratts with pinned connections were simple to erect but lacked strength and lateral stability. Many were washed out, failed or were replaced while designated highways were improved and traffic weights increased following World War I.

The Renwick Road bridge is a plain functional structure, economically if somewhat uniquely designed, and lacking the characteristic ornamentation often found in earlier structures. Builder's plates are mounted above the portals.

THE WROUGHT IRON BRIDGE COMPANY
BUILDERS
CANTON, OHIO

Lack of sway frames and knee bracing at the upper level are indications of a truss designed without provisions for wind loads, a common practice for bridges built in the 1880s. Knee bracing was generally added to bridges of the 1890s. The Renwick bridge has pin connections between interior posts and floor beams.

The Renwick Road Bridge is one of the few remaining trusses in Illinois which were designed, fabricated and built by independent bridge companies. Good maintenance and controlled traffic has enabled this anachronism of early bridge engineering to survive.

B. The Manufacturer

The Wrought Iron Bridge Company

The Wrought Iron Bridge Company (WIBC) of Canton, Ohio, was organized in 1864 by David Hammond, a Stark County carpenter-turned-bridge-builder. Incorporated in 1871, it became one of two leading bridge companies which gave Ohio a national bridge building reputation. Despite the claim of Indiana commissioners that Hammond was no engineer, he was a good promoter, and his firm owned a number of patents. The company built more bridges in Indiana than any other company. Two other known WIBC structures remain in Illinois, Big Bureau Creek Bridge, 3.5 miles east of Tiskilwa, built in 1899, and the Muirheld Bridge, 3.1 miles north of Blue Mound, built in 1893.⁸

WIBC distributed catalogs, and agents in the field secured bridge contracts from towns and highway commissioners in their region. Catalogs familiarized the town fathers and bridge committees with the product line. Hence the term "catalog bridges," because they could be ordered "by-the-foot" directly from the catalog, shipped to the site and erected by local crews under the supervision of company agents.⁹

Formed in the dynamic period of the industry's history, Wrought Iron adjusted as bridge building progressed from a craft to an industry. Challenged by the shift of the iron industry to steel, the emergence of professional bridge engineering, and the evolution of business methods, it survived to be absorbed into the American Bridge Company in 1900, as were half of the nation's fabricating companies still in existence. It is questionable that the company would have continued to use the Wrought Iron name plate after merger.¹⁰

The first Chief Engineer of WIBC was Joe Abbott in 1871. He was succeeded by E.J. Landor in 1877. Landor, the first college trained engineer in Canton, was born in London, Ontario, and did engineering work for the first bridge over the rapids to Goat Island at Niagara Falls, New York.¹¹

C. Structure Description¹²

For a schematic sketch of the Renwick Road truss prepared by Boyer Engineering, Ltd. see page 11.¹³

Through Pratt truss; steel; total length 156'-0" back to back of abutments; originally 150'-9" center-to-center of bearings with nine (9) panels at 16'-9"; present center-to-center bearing length is 151'-2". Distance center to center of trusses 17'-2". Roadway width 12'-3" (fenced). Height between upper and lower chord center-lines 22'-0". Clear height above the roadway at portal 15'-11" (10' width).

1. Superstructure:

Truss details are symmetrical about center of fifth panel.

Inclined end posts and upper chords:

Two channels 8"x1-7/8" with 14"x1/4" continuous top plate, 3/4" rivets at 5" centers; single lacing 1-3/4"x1/4" at 15" (+/-) centers on bottom.

Lower chords:

L0-L1, L1-L2 two bars 2"x1", loop ends.

L2-L3 two eye-bars 4"x1".

L3-L4, L4-L5 two eye-bars 5"x1".

Vertical Members:

U1-L1 hip vertical, one rod 1-3/8" dia., loop ends

U2-L2, U3-L3, U4-L4 intermediate posts, two channels 6"x1-3/4" webs normal to roadway, 8" out to out toes, single lacing 1-1/2"x1/4" at 13" alternate centers each side.

Diagonals and counters:

- U1-L2 main ties, two bars 2-1/2"x1", loop ends.
- U2-L3 main ties, two bars 2-1/2"x3/4", loop ends.
- L2-U3 counters, two rods 3/4" dia., loop ends, turnbuckles, upset threads.
- U3-L4 main ties, two bars 1-1/2"x3/4", loop ends.
- U4-L5, L4-U5 counters, two rods 1" dia., loop ends, turnbuckles, upset threads.

Floor Beams (fabricated): Flange angles 3"x3"x1/4", 22"x1/4" web, pin 2" dia. connection to intermediate posts permits side-sway; lower chord pins 6" above top of floor beam.

Bottom lateral cross-bracing:

- All rods have loop ends around vertical pins 1-3/4" dia. attached to flange plate and brackets at upper outer edges of floor beams; upset threads with turnbuckles.
- L0-L1, L1-L2 Single rods 1-1/4" dia.
- L2-L3 Single rods 1" dia.
- L3-L4, L4-L5 Single rods, 3/4" dia.

Stringers (joists):

- Two edge channels, five interior I beams, 8"x4", at 2'-6" centers.

Pins:

- Panel connections: L0 2-1/4" dia.; others approx. 2" dia.

End bearings:

- West end, expansion, 16"x19" end plate, 20"x20" base plate, seven 1" dia. rollers 18" long, expanded approx. 3".
- East end, framed to base plate 20"x20", four 1-1/4" dia. anchor bolts.

Rivets: 3/4" dia. main members

Top lateral bracing:

- Struts; I-beam 5"x2", 3-1/2" continuous cover plate riveted to top, end plates on bottom; top and bottom connection plates to upper chord at panel points; without knee bracing.
- Lateral cross bracing in each panel; rods, approximately 1" dia., end loops bent and packed on U-joint connection pins, turnbuckles.

Portals:

- Sloping lattice assembly; upper transverse section, full width, 2'-8" deep; knee braces 4'-3"x4'-3", with arc about 6'-0" radius. Transverse and arc framing angles are paired 3"x3", lacing approx. 1-1/4"x3/16", intersecting and riveted in diagonal squares at 9" cts.; assembly edge frame riveted to end post channels.

Deck:

Open grid steel flooring, 2-1/2" deep; roadway width is the 12'-0" panel length.

Rail:

Chain link fences 49" high above deck, at ends of grid flooring. Stanchions 6"x6" at floor beams. Impact rail 12"x4" steel box beams 27" above the floor.

2. Substructure:

Coursed limestone masonry abutments with bearing seat 3'-0" wide and 6" wide backwalls. Integral masonry wings at 45° are stepped and about 15'-0" long. Height of front bearing wall is approx. 15'-0" above the stream bank, total height estimated 20'-0"

D. Present Condition And Modification

Maintenance of superstructure and substructure has been good. A few missing or defective rivets of the truss have been replaced with bolts. Deteriorated cover plates at lower ends of end post and intermediate columns are patched with welded plates. The bridge paint is uniform and in good condition, having faded to a clay color. Bearings are clean.

Steel grid flooring, chain link fence railings and impact rails were added ten years ago. Although deck welds continue to break and the floor grids vibrate noisily under traffic, no distress areas were noted in bridge members during the inspection.

The original masonry substructure appears intact and in good condition with few indications of aging.

The bridge is posted for four tons and is one lane wide. Sight distance is limited by the curving wooded approach on the east side and a steep fifteen-foot approach fill on the west. Due to these alignment hazards approaching drivers are cautious and proceed only when passage is clear. Posted speed in the area is 10 miles per hour.

E. Ownership and Future

The Renwick Road Bridge is owned and maintained by the Plainfield Township Highway Department. Construction of a replacement bridge at the same location is programmed for Fiscal Year 96.

The existing bridge will be moved intact to new limestone abutments fifty feet north and parallel to the present alignment for pedestrian and bicycle use. On the east side of the DuPage River the projected path will generally parallel the current River Road to Plainfield, a mile and a half distant.¹⁴

The proposed location, which is acceptable to the local and Illinois state historical societies, will preserve the details and historic integrity of the Renwick Road Bridge, the last surviving through truss in Will County.¹⁵

IV. END NOTES

¹A History of Plainfield "Then and Now" (Second edition, Plainfield Enterprise, 1977) pp. 5,6

²Ibid., p. 6

³Ibid., pp. 6,7

⁴Ibid., p. 48

⁵Nature Conservancy flier.

⁶David Plowden, Bridges: The Spans of North America (New York: Viking Press, 1974), pp. 62, 67.

⁷Illinois Highway Commission Report (Springfield: State of Illinois, 1906), pp. 55ff.

⁸Victor C. Darnell, Directory of American Bridge Building Companies, 1840-1890 (Washington, D.C.: Society for Industrial Archaeology, 1984), pp. Introduction, 48; David A. Simmons, "Engineering and Enterprise, Early Metal-Truss Bridges in Ohio", in Timeline (Columbus, Ohio: Ohio Historical Society, Feb.-Mar. 1985), pp. 26, 27; James L. Cooper, Iron Monuments to Distant Posterity, Indiana's Metal Bridges, 1870-1930 (DePauw University and others, 1987), pp. 6ff.; Illinois Department of Transportation, Historic Bridge Survey List (Springfield: Bureau of Location and Environment, 1992), pp. 3101m.2TP, 3101a.TP.

⁹1990 Calendar (New York: American Society of Civil Engineers, 1989) pp. Introduction, June.

¹⁰Ibid.

¹¹Ibid.; Files and correspondence, 1995 (Canton, Ohio: Ramsayer Research Library, Stark County Historical Society, 1995).

¹²Nomenclature source: Milo S. Ketchum, C.E., Structural Engineer's Handbook (Chicago: McGraw-Hill, 1924), pp. 140, 676, others; Measurements by the author, August 25, 1994, July 6, 1995.

¹³Schematic sketch, Renwick Road Bridge (Springfield, Boyer Engineering Ltd., 1995).

¹⁴Conversation with Larry See, Plainfield Township Highway Commissioner, July 6, 1995.

¹⁵Deborah Dryden, "Plans presented for new Dupage River bridge at Renwick Road," The Enterprise (Plainfield, February 17, 1993).

V. BIBLIOGRAPHY

A. Books

A History of Plainfield "Then and Now". (Second Edition, Plainfield Enterprise: 1977). (An early history of the area.)

Cooper, James L. Iron Monuments to Distant Posterity (Indiana's Metal Bridges, 1870-1930). DePauw University and others, 1987. (Informative information on The Wrought Iron Bridge Company.)

Darnell, Victor C. Directory of American Bridge Building Companies, 1840-1990. Washington D.C.: Society for Industrial Archaeology, 1984. (An authoritative source book published by a branch of the Smithsonian Institution.)

Ketchum, Milo S., G.E. Structural Engineers' Handbook. Chicago: McGraw-Hill, 1924. (An early classic on bridge design practices, originally published in 1908.)

Plowden, David. Bridges: The Spans of North America. New York: Viking Press, 1974. (An overview and illustrated history of the advancement and romance of bridge building.)

B. Reports

Historic Bridge Preservation List, Illinois Department of Transportation. Springfield: Bureau of Location and Environment, 1992.

C. Newspapers

Dryden, Deborah. "Plans presented for new Dupage River Bridge at Renwick Road", The Enterprise. Plainfield: February 17, 1993.

D. Miscellaneous

1990 Calendar, American Society of Civil Engineers. New York: American Society of Civil Engineers, 1989. (Calendar notes and illustration of a bridge built by The Wrought Iron Company).

Files, Ramsayer Research Library, McKinley Museum, Canton, Ohio.

E. Library Resources

Plainfield Public Library District
705 North Illinois Street
Plainfield, IL 60544
Telephone 815-436-6639
(Local History).

Ramsayer Research Library
Stark County Historical Society
McKinley Museum
800 McKinley Monument Drive N.W.
Canton, OH 44708-4800
Telephone 216-455-1137
(Wrought Iron Bridge Co. data).

Illinois State Historical Library
Old Capitol Square
Springfield, Illinois 62756
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(Histories, newspaper microfilms)

F. Conversations

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G. Schematic Sketch of Renwick Truss

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August 15, 1995



