

HARMONY ROAD BRIDGE (Bridge No. F16-24)
Harmony Road spanning Little Catoclin Creek
Myersville vicinity
Frederick County
Maryland

HAER No. MD-120

HAER
MD,
11-MYRV.V,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Northeast Region
Philadelphia Support Office
U.S. Custom House
200 Chestnut Street
Philadelphia, P.A. 19106

HISTORIC AMERICAN ENGINEERING RECORD

HARMONY ROAD BRIDGE (Bridge No. F16-24) HAER No. MD-120

HAER
MD
11-11-1996
1-

Location: Harmony Road spanning Little Catocin Creek
Myersville Vicinity
Frederick County
Maryland

UTM: 18.281910.4373220
Quad: Middletown, MD., 1:24,000

Date of Construction: 1918

Contractor: M.D. Porman

Present Owner: Frederick County Department of Public Works
118 North Market Street
Frederick, Maryland 21701

Present Use: Vehicular bridge
Proposed for removal in 1996/1997.

Significance: This bridge is associated with the development of transportation in Frederick County. Metal truss bridges were the most popular bridge form in the county between the 1870s and 1930s, facilitating vehicular movement throughout the developing region. These bridges, once common throughout rural Maryland, now represent an increasingly rare example of a modest, yet vital engineering structure found throughout the rural, farming areas of the state.

Project Information: The bridge is being removed to Thurmont, Maryland for use as pedestrian bridge across Hunting Creek. It is currently structurally insufficient for its vehicular load. To mitigate the adverse effect of removal of the bridge from its original location, the State Historic Preservation Office stipulated documentation of the bridge. This documentation was undertaken to fulfill that stipulation.

Elizabeth Jo Lampl
Lampl Associates
5111 Allan Terrace
Bethesda, MD 20816

BRIDGE DESCRIPTION

The Harmony Road bridge is located on Harmony Road, southwest of State Route 40 and immediately northeast of Interstate 70. The bridge spans Little Catocin Creek at a point just north of the entrance to a historic farmstead known as Valecreek Farm. The area is rural and picturesque, although Harmony Road is fairly heavily traveled.

The bridge is a single-span, four-panel, steel, pony truss, Pratt, half-hip, pin connected structure. It retains its cast-iron manufacturer's plaque, which is located on the south handrail at the west end. The plaque identifies the date of construction as 1918, and lists the County Commissioners of that year, along with the County Clerk and Attorney. It identifies M.D. Porman as bridge "contractor."

The bridge is 63 feet long with a 12 foot roadway and features reinforced concrete abutments and wingwalls. It is constructed of steel manufactured at the Lackawanna Plant in Buffalo, New York. The "Lackawanna" imprint is visible on the rolled members: the bridge chords and inclined end posts. The bridge is composed of four, 15' 9 1/2" panels, set in a Pratt, half-hip configuration. The bridge's post and chord connections are pinned. The chords and end posts are wide, solid features, revealing the structure's 20th-century heritage. The tie and bottom lateral rods are slim, delicate features. The handrails and intermediate posts are latticed. The floor features a combination of steel and timber stringers. The steel stringers are new galvanized members. New lateral bracing has been placed in the two end bays and timber deck boards and curbs are also recent. Other than this work, most of the repairs have been standard maintenance. As of September, 1995, the bridge was reported in good condition, except for heavy corrosion of bottom chord pin connections and heavily flaking paint.

Although partially obscured by paint, the bridge's identifying plaque indicates a 1918 construction date. This date is towards the latter part of the period of metal truss bridge construction in the County, with most bridges constructed between the 1870s and 1930s. For its era, the bridge is typical in its use of steel members, but is a slightly late example of a pin-connected Pratt truss. According to engineering treatises of the day, rivetted connections were considered preferable to pinned connections for Pratt-type, low truss highway bridges as early as 1908.¹ Pin-connected low truss highway bridges were thought to lack sufficient lateral stability.²

¹ Milo Ketchum, C.E., *The Design of Highway Bridges*, New York: McGraw-Hill Book Company, 1908, p. 199.

² *Ibid*, p. 210.

MANUFACTURING INFORMATION

Little is known about M.D. Porman, the bridge contractor. Although the bridge is similar in character to some other inventoried truss bridges in the County, the level of Porman's work as a contractor in the County is unknown. A review of Maryland Historical Trust inventory forms for other truss bridges in the state did not turn up Porman's name. A review of Frederick City Directories for the years 1916-1918, and the Baltimore City Directory for 1918 also yielded no answers.

The most likely scenario for the construction of the Harmony Road Bridge would have been that M.D. Porman assembled the bridge from a "kit" provided by a bridge company.³ The County Commissioners, identified on the bridge's plaque, would have specified a certain bridge from a bridge company, ordering - via the company's form - a single-span, Pratt, pony truss, pin-connected bridge. The bridge's various components would have been standardized parts manufactured at the Lackawanna Steel plant (channels, plates, bars, etc.) which the bridge company then would have fabricated into bridge parts (posts, struts, chords, etc.). These bridge components would have been cut, machined, and assembled at the shop, then disassembled, and shipped as a kit to the bridge site. The kit would have contained the various bridge sections (with imprints or matchmarks on larger members) and detailed instructions and plans. In more typical cases, the bridge would have been assembled by a bridge company representative, but, in the case of the Harmony Road Bridge, it appears that Porman, an individual contractor, did the assembly work himself. (Original drawings identifying the design source of the bridge are not known to exist.)⁴

SIGNIFICANCE

The Harmony Road Bridge has local significance for its role in expanding the agricultural economy of Frederick County by connecting remote farm roads with more well-traversed

³ Conversation with Robert Vogel, former Curator, Division of Mechanical and Civil Engineering, the Smithsonian Institution. Mr. Vogel admits that this design attribution is speculation, but states that it is unlikely that Porman himself, a "contractor," would have had the design expertise to be the bridge's designer.

⁴ It is unlikely that Lackawanna Steel itself played any major role in the design of the Harmony Road Bridge. A review of Lackawanna Steel product literature yielded handbooks of the 1910s - 1920s period directed at builders, engineers, and architects, but these sources contained stress and weight tabulations for individual steel elements (angles, channels, plates, etc.) rather than instructions for fabricated products.

thoroughfares. It is also significant structurally as a local example of a low highway, pin-connected, Pratt, half-hip bridge of the early 20th century.

Historical

The Harmony Road bridge facilitated the flow of traffic and goods between the Myersville Road to the southwest and two roads to the northeast, the Wolfsville Road and the much more heavily traveled Baltimore National Pike (Route 40). Harmony Road was the main road for the tiny community of Harmony, located northeast of the bridge on the opposite side of Route 40. The Harmony community dates back to the mid-18th century, and has its roots in farming and milling. In addition to several historic houses and farmsteads in Harmony, there are three significant historic churches in the community. The oldest, the Harmony Church of the Brethren, dates to 1840, with the Reformed Baptist Church and Harmony Community Lutheran Church, completing the ecclesiastical ensemble. This enclave of churches in close proximity to one another gave the town its prior name, "Bellsville." In 1890, the town received its first post office and, by 1900, the community contained four blacksmitheries, three general stores, two cobbler shops, and numerous apple orchards which produced apple cider for distribution statewide. The Valecreek Farm, located outside of the main part of the community just opposite the Harmony Road bridge, contains a Federal-era farmhouse (with Victorian alterations), attesting to the long-term settlement of the area as a farming community. A June 22, 1918 article in the local Frederick paper described a June 2nd washout of the previous, wooden bridge at the Harmony Road site near the farm. A new sewer was put in place to carry the water away during floods. Based on the manufacturer's plaque, a metal truss bridge installed later that year must have been selected as the sturdier solution for the crossing.

Structural

Constructed in 1918 of steel, the Harmony Road Bridge is a significant indicator of the metal truss bridge tradition in Frederick County. A truss bridge is defined by Milo Ketchum in his 1920 work, *The Design of Highway Bridges of Steel, Timber, and Concrete* as follows:

A truss is a framework composed of individual members so fastened together that loads applied at the joints produce only direct tension or compression. The triangle is the only geometrical figure in which the form is changed only by changing the lengths of the sides. In its simplest form every truss is a triangle or a combination of triangles. The members of the truss are either fastened together with pins, pin-connected, or with plates and rivets, riveted.⁵

⁵ Milo Ketchum, *The Design of Highway Bridges of Steel, Timber, and Concrete*, New York: McGraw-Hill, Co., Inc., 1920 (2nd edition), p. 103.

Metal truss bridges began replacing wooden truss bridges nationally, in the 1840s, and, in Frederick County, in the 1870s. The real push for metal truss bridges resulted from the popularization of the railroad, which demanded that heavier loads be carried over waterway spans.

The first all-metal truss bridges were constructed of iron; a combination of cast and wrought iron members being necessary for both compressive and tensile force. In the 1870s, the brittleness of cast iron put an end to its use and bridges came to be built entirely of wrought iron. Wrought iron had both tensile and compressive properties, and could be manufactured more economically.

The Pratt truss, the type seen at Harmony Road, was patented by Thomas and Caleb Pratt in 1844. It is characterized by a design with vertical compression members and diagonal tension members. It was a particularly popular solution for highway bridges because of its relative ease of construction and strength. For low truss highway bridges spanning from 30 to 80 feet, either the Pratt or Warren types were recommended.⁶ For pin-connected, low truss highway bridges, the Pratt type was preferred.⁷

The Pratt Half-Hip subtype, useful for short spans, became popular in the 1890s and remained so throughout the early 20th century. In addition to the Harmony Road Bridge, at least one other example of this subtype, with similar pony truss and pin-connected characteristics, has been inventoried in the state. Built in the early 20th century, this bridge was constructed in Washington County, just west of Frederick County, by the Smith Bridge Company of Toledo, Ohio.

Construction by bridge companies was very common in the late 19th and early 20th centuries. These specialty firms organized in the late 19th century specifically to manufacture iron truss bridges. Many had their origins as foundries, forges, or as local builders with expertise in timber bridge construction, and the majority of bridge companies were located in the northeast and midwest (although Baltimore County had quite a few in the state of Maryland). The companies would manufacture bridge components from individual steel members, assemble the structure to test its strength and durability, then de-assemble and ship the product in a kit to small localities. There, the bridges would either be assembled by company representatives or local contractors. Twenty small bridge companies, mostly out of New York, Pennsylvania, and Ohio, are known to have produced metal truss bridges for Frederick County.⁸

⁶ Ketchum, 1908, p. 199.

⁷ Ibid, p. 208.

⁸ Maryland Historical Trust Inventory Forms for metal truss bridges in Frederick County.

In 1875, the development of steel by the Bessemer process, followed by the advent of the open hearth process, caused the demise of the iron truss bridge and its replacement with steel. Steel was more durable and stronger than iron and as cheap to produce. The transition from iron to steel truss bridges occurred nationally in the 1890s. While some truss bridges in Frederick County are fabricated of steel from that decade, iron truss bridges continued to be built there up until the 1910s. Small bridge companies exploded in growth in the 1880-1910 period to capitalize on the new steel market. The use of steel permitted easier fabrication of truss bridges at the shop site.

Beginning in 1900, however, the small bridge companies felt the pressure of competition from large steel manufacturers, who entered the bridge manufacturing market as a natural outgrowth of their steel manufacturing role. Andrew Carnegie's American Bridge Company was created as a subsidiary of the United States Steel Corporation that same year, and was able to buy up many of the small bridge companies across the country. In later years, other steel giants, such as Bethlehem Steel, entered the bridge design and erection field as well. The participation of the big corporate giants, coupled with standards published by state highway commissions, resulted in the increasing standardization of truss bridge types.

In the 1920s, state highway commissions also developed standards for reinforced concrete bridges and these new spans began replacing the metal truss bridges. By the 1930s, reinforced concrete bridges replaced metal truss bridges as the structure of choice for small, local spans, although rural outposts continued to build the metal trusses through the decade. In the 1940s, steel girder bridges were introduced, and the metal truss bridge for small spans was virtually extinct. It remained popular, and was catapulted into a highly visible art form, however, for monumental river spans in the 1930s and 1940s.

CONCLUSION

A majority of the surviving metal truss bridges in Maryland are Pratt through and pony truss bridges, of both pin and rivetted connections. Nonetheless, these structures are a dying breed. At one time fairly common in Frederick County, there were forty metal truss bridges standing in 1975. Approximately 24 stand today. Six of the County's iron truss bridges; three wood-truss, covered bridges; and one stone arch bridge are listed on the National Register of Historic Places.

SOURCES OF INFORMATION

A. **Engineering drawings:** None.

B. **Historic views:** None.

C. **Interviews:**

1. Ken Harwood, Engineer, Frederick County Department of Public Works, Division of Transportation Engineering. Transportation engineer and local bridge historian. June 24, 1996 telephone interview.
2. Robert Vogel, Industrial historian and metal truss bridge scholar. June 28, 1996, telephone Interview.

D. **Bibliography:**

Primary and Unpublished Sources:

Deibler, Dan Grove. *A Survey and Photographic Inventory of Metal Truss Bridges in Virginia, 1865-1932*. Charlottesville, Vir.: Virginia Highway & Transportation Research Council, May 1975.

Frederick County Department of Public Works, Division of Transportation Engineering. Harmony Road Bridge Inspection and Technical Data Notebook.

Frederick County Historical Society. Vertical Files: "Harmony" and "Bridges."

Frederick County Public Libraries. Vertical File: "Bridges."

Maryland Historical Trust. Individual Property/District, Internal National Register Eligibility Review Form: Harmony Road Bridge, February 1993.

Maryland Historical Trust, State Historic Sites Inventory Form: Harmony Road Bridge (F-4-24).

P.A.C. Spero & Company and Louis Berger & Associates, Inc. *Historic Bridges in Maryland: Historic Context Report*. Baltimore: Maryland State Highway Administration, September 1994.

Published Sources:

Comp, T. Allan and Donald Jackson. *Bridge Truss Types: A Guide to Dating and Identifying*. Historic American Engineering Record, National Park Service, Technical Leaflet 95, 1977.

DeLony, Eric. *Landmark American Bridges*. Boston: Little, Brown and Company, 1993.

Jackson, Donald C. *Great American Bridges and Dams*. Washington, D.C.: The Preservation Press, 1988.

Ketchum, Milo S., C.E. *The Design of Highway Bridges and the Calculation of Stresses in Bridge Trusses*. New York: McGraw-Hill Book Company, 1908.

_____. *The Design of Highway Bridges of Steel, Timber and Concrete*. New York: McGraw-Hill Book Company, 1920.

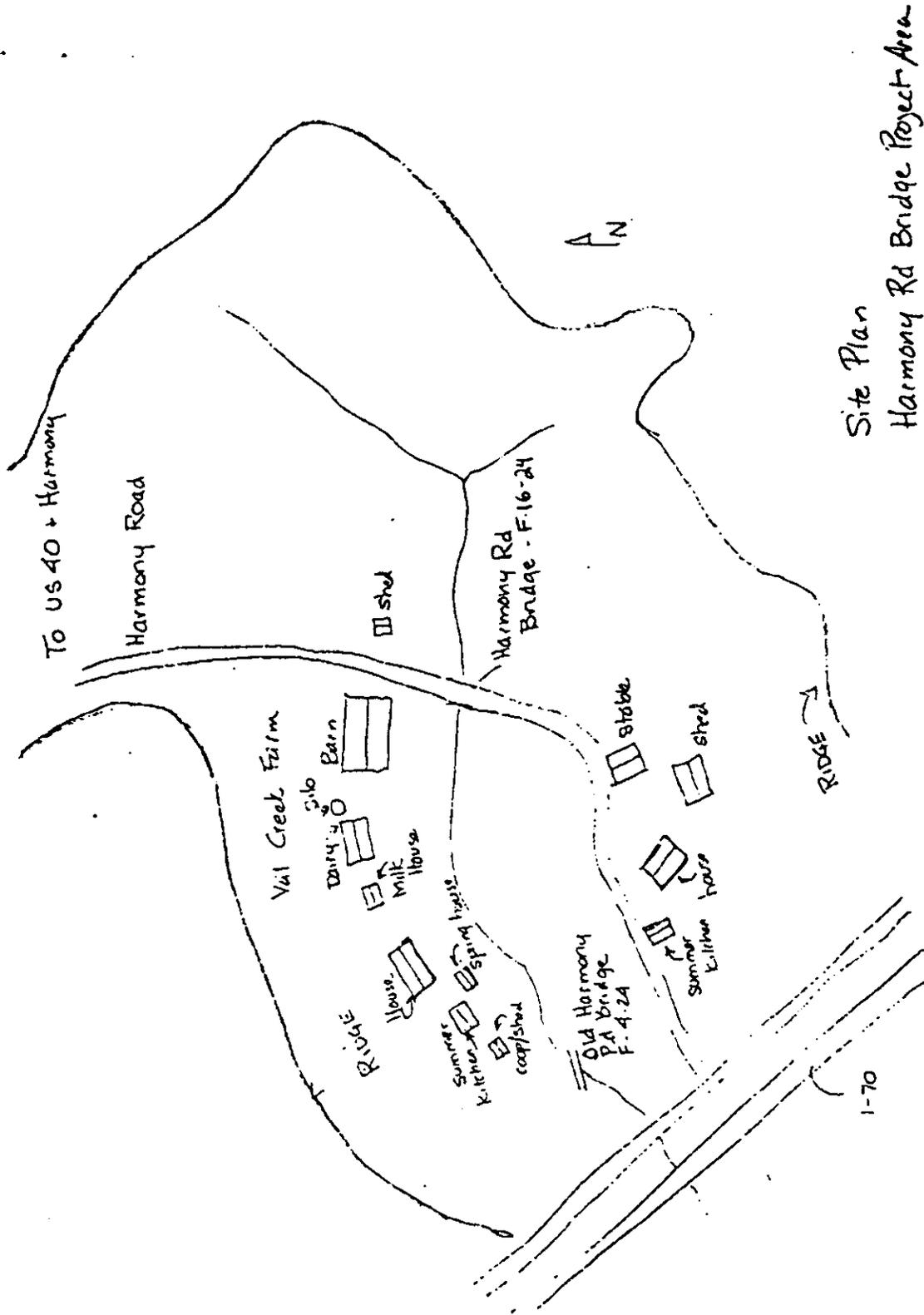
Plowden, David. *Bridges: The Spans of North America*. New York: Norton, 1984.

Leary, Thomas E. *From Fire to Rust: Business, Technology, and the Work at the Lackawanna Steel Plant, 1899-1983*. Buffalo: Buffalo and Erie County Historical Society, 1987.

The Daily News (Frederick City, MD), June 22, 1918, p. 3.

E. **Likely sources not yet investigated:** None.

F. **Supplemental material:** None.



Site Plan
Harmony Rd Bridge Project Area
Frederick Co., MD
Not to Scale