

OHIO DEPARTMENT OF TRANSPORTATION
HISTORIC BRIDGE SURVEY REPORT

6/9/2011



SFN #: 6741150 County: PORTAGE Municipality: CHARLESTOWN TWP
NR Rec: Eligible Previous Inventory/Date: FIRST INVENTORY, 1981 Status: Non-Select

ODOT District: 04 Owner: RAILROAD Lat/Long: /
Location: S SR 5 @ RAVENNA ARSENAL UTM: 17.485120.4555120
Feature On: TH 169 (KNAPP RD)
Feature Intersected: CSXT (B&O)
Type: PONY TRUSS Design: WARREN (RIVETED)
Material: STEEL
Railing Type: BEAM GUIDE RAILS
Spans: 3 Overall Length: 104 ft. Out to Out Width: 20.2 ft. Roadway Width: 18.2 ft.
Year Built: 1904 Alteration (Date): Source: CSXT
Designer/Builder

Setting/Context:

The bridge carries one lane of a 2 lane road over a 2 active railroad tracks of the former B&O RR main line now operated by CSXT. The road is immediately south of SR 5 and the WW II Ravenna Arsenal munitions plant. The line was double tracked in the early 20th century, and this overpass appears to be part of that improvement campaign. There are curves at both ends of the bridge; the approach road geometry and sight lines are substandard. There is modern development on the

Physical Description:

The 3 span, 104'-long, rivet-connected Warren pony truss bridge has a 44' span over the tracks flanked by 30'-long spans. The bridge deck is about 15' wide. The truss lines are traditionally composed with angles and plates, but what is rarely seen is a riveted bridge with suspended floorbeams using U-shaped hanger or suspenders around a traditional pin at the lower panel point. The detail is transitional and represents ease of erection. There have been in kind repairs and replacement of original fabric, including new rolled floorbeams, wood plank deck, reconstruction of one of the column bents, high-strength bolts for rivets, and portions of the lower chords. The original pipe railings have been lost, and the current railings have impact damage.

Integrity:

There is replacement material, but maintains aspects of integrity.

Summary of Significance:

The 1904 bridge is one of seven, similar design, riveted Warren pony truss bridges located over the former B&O Railroad's main line between Baltimore and Chicago that were placed between 1904 and 1907. The bridges are historically and technologically significant as early and complete examples of their bridge type and for their association with the development and operation of a major trunk railroad linking mid-western and eastern markets. Initially developed starting in 1890, the main line to Chicago was double tracked in the early 1900s, and the overpass bridges date from that improvement campaign. Three additional bridges of the same design that are located in Ashland and Trumbull counties, and there are others over the main line in Indiana (Noble County).

The bridges built to basically the same design are dated by the railroad from 1904 to 1907, and they rank among the very earliest extant riveted Warren pony truss bridges in Ohio. Only two others predate 1904. The Warren pony truss bridge is a historically and technologically important resource type because of its contribution to the development and improvement of farm to market roads during the first three decades of the 20th century. With its rigid connections and

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thus greater load-carrying capacity over earlier pin-connected bridges, the Warren truss is also important in the evolution of the metal truss bridge type. With their pin-connection and suspended floorbeams that recall the earlier type of field connection, the B&O overpasses are also important in marking the transition from technology to another. Whatever informed the design decision for suspended floorbeams, the detail is uncommon and reflects experimental thinking. In addition to the B&O bridges, pin-connected floorbeams on an otherwise riveted pony truss bridge have been documented twice -- one on a 1904, 76'-long and 13.5' wide Warren with verticals pony truss bridge in Burlington County, New Jersey (03D3760) and again on a 1910 York Bridge Company Warren with verticals pony truss bridge in Morrow County, Ohio (5930448). The Morrow County example has the same pin detail as the B&O bridges while the Burlington County example has paired suspenders with filled tops or saddles that are fitted over the gusset plate. Burlington County does not have documentation as to the fabricator of their bridge; the Morrow County bridge has a makers plaque.

Warren trusses are the most common truss design found in Ohio and the nation. The Ohio Phase 1A survey (2008) has identified more than 500 examples dating from 1897 (25XXXX1 and only 19th century example) to 1961, accounting for well over half of the approximately 800 pre-1961 metal trusses. The Warren design was particularly well suited to rigid (riveted, and later welded connections), and this helps to explain its popularity in the 20th century rather than the 19th century that was dominated by pinned field connections. The truss design is based on a British patent issued to engineers James Warren and Willoughby Monzani in 1848. In the US, the increased usage of the Warren truss coincided with improvements in pneumatic field riveting equipment starting about 1900. The Warren design, which is based on a series of equilateral triangles, is identified by its simplicity of design, ease of construction with equal-sized members, and ability of some diagonals to act in both tensions and compression. Riveted bridges better accommodate secondary stresses.

Warren trusses were a standard design of the Ohio State Highway Department in the 1910s and 1920s, but the design achieved greatest popularity with county engineers starting in the early 1900s. The counties purchased the bridges from Ohio fabricators such as the New Columbus Bridge Co., Champion Bridge Co. and the Mt. Vernon Bridge Co. Despite the popularity of the Warren truss bridge, fewer than 12 rivet-connected Warren trusses date prior to 1910 have been identified in Ohio, and they represent the period when the rivet-connected design solidified its position as the most popular prefabricated county truss design. The design was also popular with the railroads for the same reasons; it was efficient and economical.

Each of the four inspected B&O overpasses (51XXXX2, 51XXXX3, 51XXXX4, 6741150) stands in a good state of completeness, including truss lines, pipe railings (or evidence of the original railings), suspended floorbeams, and wood plank decks. Repairs over the years have largely been in kind, and the bridges maintain all the aspects of integrity and as well as their historic context. They represent the lighter vehicular overpasses constructed by railroads to increase the efficiency of their rail operations, particularly on through freight lines, by eliminating at-grade crossings. This group of bridges reflects as well as any rural overpasses in the state period railroad thinking about railroad operations and how to most efficiently and economically accommodate ever-increasing vehicular (albeit initially buggies and wagons) usage that could effect operations. Singularly and collectively, the B&O overpass bridges in Portage and Medina counties, and mostly likely those in Ashland and Trumbull counties as well, are historically and technologically significant under National Register criteria A and C.

The B&O main line, established on its current route by way of Akron in 1891, is historically significant as a major east-west through route from Chicago to the East Coast. The line provided the B&O a superior route due to its gentle grades and directness. To this day, the line remains an important through freight route and is used by Amtrak for its service between Chicago and major east coast cities (criterion A).

The B&O was the first common carrier railroad in the United States. It was established in 1827 to connect Baltimore with a point on the Ohio River. Building west starting in 1828, it finally reached Wheeling in 1853, and then continued westward to Columbus in 1866 by leasing the Central Ohio RR across the Ohio River from Wheeling. The B&O became the first railroad to provide direct service between central Ohio and major eastern markets, contributing significantly to the agricultural and industrial development of the region in the latter half of the 19th century.

In the years after the Civil War, the venerable B&O expanded to become one of three major rail systems (the other two

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were the Pennsylvania and the New York Central) offering service to most major cities in Ohio and through service to East Coast ports from Chicago and St. Louis by way of points in Ohio. This was accomplished both by way of acquisition of short lines as well as new construction in an atmosphere of intense competition between the systems. The B&O offered through service to Chicago as early as 1874, but the original route by way of Wheeling and Newark, Ohio, had drawbacks, including steep grades and less-than-desirable alignments through West Virginia and southeastern Ohio. Over the next 30 years, the B&O made concerted efforts to improve efficiency and lower operating costs, applying then-current principles of economic location as expressed by Arthur M. Wellington in his classic *The Economic Theory of the Location of Railways* (1887). This work promoted the use of economic data, such as time and cost saved by better grades and straighter alignments, to justify the capitalization on the improvements. To achieve this end, in 1890-91 the B&O re-routed its Chicago main line for a more direct route. Rather than passing through Wheeling and Newark, it went by way of Pittsburgh and Akron. This was accomplished by acquiring the Pittsburgh & Western Railway, which already operated between Pittsburgh and Akron, and building a new line 73 miles-long from Akron to Chicago Junction, a point on its original 1874 route 90 miles north of Newark near Willard. As a result, the B&O greatly shortened and improved the grades of its through route. By 1905, due to the high volume of traffic on the route, the B&O was double-tracking the line for greater capacity. This included eliminating at-grade crossings by constructing overpass bridges like the pony truss spans in Ashland, Portage, Trumbull and Medina counties and those in Indiana.

Reviewed By/ Date: MEM 5/09

Notes:

More photos in folder. OES is working with RR to have some of the population relocated.

For Eligible Bridge:

Level of Significance: High

Justification:

Of the over 140 examples built between 1897 and 1960, only 13 predate 1910, which makes early ones not common. This example has high significance because it is the second oldest documented extant example in the state and for its association with one of the most important railroad lines through the state.

In Management Plan (2009)? No