PENNSYLVANIA RAILROAD, ROCKVILLE BRIDGE
Pennsylvania Historic Railroad Bridges Recording Project
Spanning Susquehanna River, north of I-81 Bridge
Rockville
Dauphin County
Pennsylvania

HAER No. PA-524

PHOTOCRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
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HISTORIC AMERICAN ENGINEERING RECORD

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HAER No. PA-524

Location:	Spanning Susquehanna River, north of I-81 Bridge, between Rockville, Dauphin County, and Marysville, Cumberland County, Pennsylvania.
UTM Coordinates:	18/337630/4466280
USGS Quadrangle:	Harrisburg West, Pennsylvania (7.5-minute series, 1987).
Dates of Construction:	1900-02.
Basis for Dating:	Plaque on bridge; secondary sources.
Dates of Alteration:	1939, 1997.
Designers:	Pennsylvania Railroad: William H. Brown, Chief Engineer, George Nauman and H. S. Righter, assistant engineers.
Builders:	Drake & Stratton Co. (Philadelphia), east half; H. S. Kerbaugh, Inc., (Philadelphia), west half.
Present Owner:	Norfolk Southern Railroad.
Present Use:	Railroad bridge.
Structure Type:	Stone arch.
Significance:	The stone arch bridge at Rockville remains the world's longest of its type, at 3,791'-0". It best represents the Pennsylvania Railroad's monumental capital investment and desire for "permanent" structures at the turn of the twentieth century. The Rockville Bridge was listed on the National Register of Historic Places in August 1975.
Historian:	Justin M. Spivey, April 2001.
Project Information:	The Historic American Engineering Record (HAER) conducted the Pennsylvania Historic Railroad Bridges Recording Project during 1999 and 2000, under the direction of Eric N. DeLony, Chief. The

project was supported by the Consolidated Rail Corporation (Conrail) and a grant from the Pennsylvania Historical and Museum Commission (PHMC). Justin M. Spivey, HAER engineer, researched and wrote the final reports. Preston M. Thayer, historian, Fredericksburg, Virginia, conducted preliminary research under contract. Jet Lowe, HAER photographer, and Joseph E. B. Elliott, contract photographer, Sellersville, Pennsylvania, produced large-format photographs.

Description and History

Heading north from Harrisburg in 1847, Chief Engineer J. Edgar Thomson surveyed a route for the Pennsylvania Railroad (PRR) that followed the Pennsylvania Canal along the east bank of the Susquehanna River. At some point, his route had to cross to the west bank and ascend the Juniata River valley on its way over the mountains to Pittsburgh. The canal remained on the east bank all the way to Clarks Ferry at the mouth of the Juniata, but the ledge it occupied became too slender for the railroad to share at Rockville, five miles north of Harrisburg. This location was less than ideal for a bridge: the Susquehanna was not particularly narrow, and the shortest (perpendicular) crossing would require sharp curves at either end. Nonetheless, PRR contracted for a single-track wooden bridge at Rockville in 1847. Contractors Holman, Simon & Burke and Daniel Stone completed twenty-three 160'-0" arch-reinforced Howe deck trusses on stone piers in August 1849.[1] The wooden structure survived a remarkable twenty-eight years, including a fire in 1868, to become a troublesome single-track restriction on an otherwise double-track line. From July to December 1877, Delaware Bridge Co. erected new double-track iron deck trusses on extensions of the existing stone piers.[2] This structure lasted barely two decades before it too began to limit capacity on PRR's profitable main line.

The current four-track stone arch bridge, built just downstream from its iron predecessor, reflects PRR's monumental capital investment and desire for "permanent" structures in the early twentieth century. Although Chief Engineer William H. Brown had designed stone arches as early as 1887 at Johnstown, it was a flurry of masonry construction between 1900 and 1906 that earned him a reputation as the railroad's "stone man."[3] Under the leadership of President Alexander J. Cassatt, PRR spent record amounts tunneling under the Hudson River into New York City, separating passenger and freight traffic in eastern Pennsylvania, and upgrading its main line to four tracks across the state. As part of the improvements, Brown and his staff designed notably long and expensive stone arch bridges over the Delaware, Juniata, Raritan, and Susquehanna rivers.[4] That the Rockville Bridge has yet to be surpassed in length makes it the most impressive artifact from this period in the railroad's history.

Despite the challenges posed by its record-breaking length of 3,791'-0" between abutments, the Rockville Bridge was the first of the large structures completed. It opened to traffic with national acclaim on 30 March 1902.[5] Most sources indicate that Assistant Engineer H. S. Righter actually prepared the plans under Brown's direction. Assistant Engineer George

Nauman supervised construction. Technical journals describing the recently completed structure found it remarkable that PRR had progressed from wood to iron to steel trusses, only to adopt the older and more labor-intensive technology of masonry arches.[6] It took extreme foresight to justify the greater expense, given that benefits of durable, low-maintenance construction would accrue slowly. In a short biography of Cassatt, historian Michael Bezilla attributes PRR's long-term vision to his leadership. Although PRR was $191 million in debt upon Cassatt's death in 1906, Bezilla states, "Cassatt's rebuilding of the railroad was crucial to its ability to remain profitable for many years."[7]

A structure as large as the Rockville Bridge could not be completed in one construction season, nor by one contractor. To permit breaks in the work, the forty-eight 70'-0" arch spans are divided into six groups by "abutment piers." Most of the piers are 8'-0" wide, but every eighth pier is 19'-0" wide, making it capable of resisting unbalanced thrust from an incomplete structure. All of the piers are founded on rock, which lies just below the shallow river's bottom. Just before work began in April 1900, *Railroad Gazette* reported that Philadelphia contractors Drake & Stratton had a contract for the easternmost group of eight spans while H. S. Kerbaugh, also of Philadelphia, had a contract for the westernmost.[8] Construction photographs from August 1900 show piers completed all the way across the river, however.[9] Evidently the contractors' scopes of work had been extended to cover their respective halves of the bridge. Because of unusually low water in the Susquehanna that summer, the contractors chose to construct all of the piers at once and complete as many arches as possible during that construction season. The arch rings were constructed on wooden truss falsework standing in the shallow river bed, which could not be left in place through the winter.[10]

The Rockville Bridge has a heart of concrete inside its Clearfield County sandstone exterior, which allowed quicker and less expensive construction. As the stone facing rose on each pier, it was filled with concrete. The piers were capped with stone skewbacks at the springing line, which is about 23'-0" above the river bottom. Masons then completed the 42"-thick arch ring on falsework, using cut-stone voussoirs to contrast with rough ashlar spandrel walls and pier faces. The arches are segmental, with a radius of 40'-7-1/2" and a rise 20'-0" from springing to crown. Each ring was built in longitudinal halves, using the same falsework for the north and south halves.[11] Once completed, the rings could stand without falsework, allowing construction of spandrel walls and pouring of concrete haunches to proceed at a different rate. The haunches are unreinforced, and simply reduce the amount of fill necessary to provide a level rail bed at 7'-0" above the arch crowns.

The Rockville Bridge is 52'-0" wide for most of its length, but widens to ease the curves at either end. At the east end, the south face of the bridge follows the 6-degree curve of the main-line tracks. The north face remains straight, accommodating a connection to the former Northern Central Railway, a freight line on the east bank. At the west end, the north face follows a 5-degree curve and the south face remains straight. The resulting wedge-shaped space at the southwest corner remained unoccupied until 1939, when it was widened to carry a new single-track spur into Enola Yard. To provide a gentler curve on the diverging track, PRR added a steel plate girder on the south side of the westernmost arch and rebuilt the wing wall.[12]

Except for the minor addition of 1939, the Rockville Bridge remains relatively unaltered. The concentrated load imposed by an overhead signal pole, however, caused a section of spandrel wall to collapse during the summer of 1997. Conrail (then the bridge's owner) replaced it with reinforced concrete, using form liners to create a texture resembling stone.[13] Because the repaired spans are toward the middle of the river, the difference in material is not visible from shore. Presently, the Rockville Bridge carries freight and Amtrak passenger trains, and so far as could be determined, remains the world's longest stone arch bridge.

Notes

1. Coverdale & Colpitts, Consulting Engineers, *The Pennsylvania Railroad Company, Description of Important Bridges and Stations* (New York, 1945), 17, typescript in folder "PRR Office of Secretary, Studies by Consultants and Puhlished Reference Materials, 1855-1958," Box 1, Penn Central Railroad Records, Manuscript Group 286, Pennsylvania State Archives, Harrisburg, Pa.

2. James J. D. Lynch, Jr., "Rockville Bridge under the PRR — a Capsule History," *Keystone* 31, No. 4 (Winter 1998): 51-54.

3. See U.S. Department of the Interior, Historic American Engineering Record (HAER) No. PA-517, "Pennsylvania Railroad, Conemaugh River Viaduct," 2001, Prints and Photographs Division, Library of Congress, Washington, D.C.

4. "Stone Bridges on the Pennsylvania," *Railroad Gazette* 33, No. 33 (16 Aug. 1901): 580.

5. Howard W. Schotter, *The Growth and Development of the Pennsylvania Railroad Company,* 2nd ed. (Philadelphia: Press of Allen, Lane and Scott, 1927), 278.

6. See, for example, "The Four Track Stone Arch Bridge of the Pennsylvania Railroad Across the Susquehanna River," *Scientific American Supplement* 57, No. 1479 (7 May 1904), or "Masonry Bridges for Railways," *Engineering Record* 45, No. 8 (22 Feb. 1902): 169.

7. Michael Bezilla, "Alexander Johnson Cassatt," in *Encyclopedia of American Business History and Biography: Railroads in the Nineteenth Century,* edited by Robert L. Frey (New York: Facts on File, 1988), 40.

8. "The Rockville Bridge of the Pennsylvania Railroad," *Railroad Gazette* 32, No. 12 (23 Mar. 1900): 190.

9. "Pennsylvania's Current Work," *Railway Age* 31, No. 11 (15 Mar. 1901): 200.

10. "The Rockville Stone Arch Railway Bridge," *Engineering Record* 44, No. 19 (9 Nov. 1901): 450.

11. Ibid., 451.

12. Lynch, "Rockville Bridge," 52-53; cf. Pennsylvania Railroad, Office of Engineer of Bridges and Buildings, "Philadelphia Division Main Line Bridge No. 110.36 — Span 48 over Old State Highway — Route 5 East of Marysville, Pennsylvania" (1 May 1939), milepost 110.36, region/division/branch 131302, aperture card files, Consolidated Rail Corp., Philadelphia, Pa. [transferred to Norfolk Southern Railway Co., Atlanta, Ga.].

13. Paul Roddy, Senior Structural Inspector for Conrail, personal conversation with author, 9 Apr. 1998.

Additional Sources

1. David M. Berman, "Rockville Bridge," Dauphin County, Pennsylvania, National Register of Historic Places Inventory and Nomination Form, 1975, U.S. Department of the Interior, National Park Service, Washington, D.C.

2. "The Rockville Bridge of the Pennsylvania Railroad," *Railroad Gazette* 32, No. 21 (25 May 1900): 338-39.

3. "The 3820' Stone Arch Bridge for the Pennsylvania R. R. at Rockville, Pa.," *Engineering News* 43, No. 19 (10 May 1900): 310-11.