KEGGEREIS FORD BRIDGE
Pennsylvania Historic Bridges Recording Project III
Spanning West Branch Conococheague Creek at State Route 4006
Willow Hill vicinity
Franklin County
Pennsylvania

HAER PA-629
PA-629

PHOTOGRAPHS

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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

FIELD RECORDS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

KEGGEREIS FORD BRIDGE

HAER No. PA-629

LOCATION:	Spanning West Branch Conococheague Creek at State Route 4006, Willow Hill vicinity, Metal Township, Franklin County, Pennsylvania
UTM:	18.263293.4444904, Fannettsburg, Pennsylvania, Quad.
STRUCTURAL TYPE:	Reinforced concrete deck arch
DATE OF CONSTRUCTION:	1907
CONTRACTOR:	Nelson Construction Company, Chambersburg
PREVIOUS OWNER:	Franklin County, Pennsylvania
PRESENT OWNER:	Commonwealth of Pennsylvania
USE:	Vehicular bridge
SIGNFICANCE:	Keggereis Ford Bridge is a multiple-span reinforced concrete arch bridge built by a regionally significant bridge contractor. It is of engineering interest for its rib arch design and its relatively early construction date. This bridge was listed on the National Register of Historic Places in 1988.
HISTORIAN:	Researched and written by Lola Bennett, April-May 2006
PROJECT INFORMATION:	The Pennsylvania Historic Bridges Recording Project III 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 Heritage Documentation Programs, a division of the National Park Service, U.S. Department of the Interior. The Pennsylvania Department of Transportation funded the project.

Chronology

1730s First settlers in Amberson Valley

1762 Pennsylvania legislature authorizes county governments to build and maintain bridges

1795 Metal Township created

1824 Bricklayer Joseph Aspdin of Leeds, England, invents Portland cement

1871 David Saylor begins production of artificial cement at Coplay, Pennsylvania

1872 America's first plain (un-reinforced) concrete bridge built at Brooklyn, New York

1875 Joseph Monier designs a 52' reinforced concrete bridge at Chazelet, France

1889 America's first concrete bridge built at San Francisco

1893 Pennsylvania's first reinforced concrete bridge built at Philadelphia

1883 Thomas Nelson and Andrew Buchanan become partners in bridge building

1889 America's first reinforced concrete arch bridge built at San Francisco

1907 Nelson Construction Company builds Keggereis Ford Bridge

1988 Keggereis Ford Bridge listed on the National Register of Historic Places

2002 Pennsylvania Historic Bridges Recording Project III

Description

Keggereis Ford Bridge is a three-span, reinforced concrete deck arch bridge. The bridge is 105' long and 15' wide overall, with arch spans of 25', 45', and 25'. The two reinforced arch ribs are connected to the deck slab at selected points with transverse beams of varying depth. The bridge is rough-finished and unornamented, except for a narrow belt course along the line of the roadway and concrete caps on the parapet walls. Incised concrete builders' plaques in the parapet wall read as follows:

J.E. ROYER D.H. TRITLE COMR P.H. HOLLER R.O. PRATHER CLERK G.A. KYNER ATTY.	BUILT BY NELSON CONSTRUCTION CO CHAMBERSBURG, PA 1907

History

The road through Amberson Valley was laid out at an unknown date prior to 1868, when it appears in Beers' *Atlas of Franklin County*. The road crossed the West Branch of Conococheague Creek at the site of an eighteenth-century ford, long known as Keggereis Ford. No records have been found concerning a previous bridge at this location. With the advent of the automobile and growing demand for good roads in the early twentieth century, residents of Amberson Valley petitioned the Franklin County Court for a county bridge to be built at this location.

On July 25, 1907, County Commissioners J.E. Royer, D.H. Tritle and P.H. Holler published a "Notice to Bridge Builders" in the local newspaper requesting bids for the erection of a 130' covered wooden bridge or a three-arch reinforced concrete bridge at this location.[1] One month later, the commissioners awarded the contract to the Nelson Construction Company of Chambersburg. Among the bidders was James N. Groninger of Port Royal, Pennsylvania, a respected covered bridge contractor, whose bid of $3,489 for a wooden covered bridge came in $39 over Nelson Construction Company's bid of $3,450 for a reinforced concrete arch bridge.[2] The bridge was completed in the fall of 1907.

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[1] "Notice to Bridge Builders," *The Public Opinion*, 25 July 1907, 5.
[2] See HAER No. PA-624 Pomeroy Bridge (Academia Bridge); "Awarded Contract," *The Public Opinion*, 23 August 1907, 1.

Design

Concrete bridges first appeared in Europe in 1840 and in the United States in 1871, but the technology remained largely experimental until the end of the nineteenth century.[3] Concrete, or "artificial stone," has little tensile strength, so early concrete bridges were constructed as solid barrel, filled arches that worked solely in compression and relied on a substantial mass of material to carry loads. Beginning in 1854 when William Wilkinson obtained a British patent for reinforcing concrete with wire rope, European and American inventors experimented with ways of combining the compressive properties of concrete with the tensile strength of iron to produce stronger, lighter, more cost efficient structures. In 1875, French gardener Joseph Monier (1823-1906) became the first individual to apply reinforced concrete technology to bridges.[4]

In 1889, a decade and a half after Monier's pioneering experiments, concrete contractor Ernest L. Ransome (1844-1917) built America's first concrete-steel span, the Alvord Lake Bridge at Golden Gate Park in San Francisco.[5] The modest 20' span was scored and roughened to imitate a traditional masonry bridge and even had artificial stalactites on the intrados, but beneath the façade was a modern concrete structure with twisted iron rods embedded in the specific zones where tension forces occur. Though not immediately popular, Ransome's concrete reinforcing system was widely used throughout the United States in the twentieth century.

Throughout the 1890s and early 1900s, other engineers, including Joseph Melan (1853-1941), Fritz von Emperger (1862-1942), Edwin Thacher (1840-1920) and Daniel Luten (1869-1945), aggressively developed and promoted the new technology. Reinforced concrete bridges were durable, aesthetic and cost effective, because they used readily available materials, could be built by local laborers and did not require extensive maintenance. With the advent of the automobile and subsequent demand for good roads and bridges, reinforced concrete bridges came into their own. By 1905, reinforced concrete was the preferred material for bridges in the United States.

The development of reinforced concrete bridges in Pennsylvania coincided with national trends, with a few experimental spans in the 1890s and widespread adoption of the technology by 1910.[6] According to the Pennsylvania Department of Transportation Historic Bridges Database, Keggereis Ford Bridge is one of eighty-one extant reinforced concrete highway bridges constructed during the first decade of the twentieth century.[7]

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[3] The world's first concrete bridge was probably the 39' Caronne Canals Bridge at Grisoles, France. The first concrete bridge in the United States was designed by landscape architect Calvert Vaux and built by the New York & Long Island Coignet Stone Company, the Cleft Ridge Span (1871-72) at Prospect Park in Brooklyn, New York.
[4] The Pont de Chazelet (1875), a 52' reinforced concrete pedestrian bridge, still survives in France.
[5] See HAER No. CA-33, Alvord Lake Bridge.
[6] "Concrete Arch Highway Bridge, Philadelphia, Pennsylvania," *Engineering News*, 7 September 1893, 189-190.
[7] A.G. Lichtenstein Associates, Inc., *Pennsylvania Historic Bridge Inventory and Evaluation*, 1997.

Builder

The Nelson Construction Company of Chambersburg, Pennsylvania, was an early builder of reinforced concrete arch bridges.[8] Company president Thomas McDowell Nelson (1849-1919; C.E. Lafayette College, 1870) of Chambersburg began his career doing railroad surveys for Walling & Gray of Boston. In 1883, Thomas Nelson and Andrew Buchanan became agents for the Pittsburgh Bridge Company.[9] Nelson moved to Pittsburgh in 1896, where he served as president of the Pittsburgh Bridge Company until 1900, when the firm merged with twenty-four others to form the American Bridge Company, a subsidiary of United States Steel Corporation.

In 1901, Nelson's son Alexander H. Nelson (b.1874; C.E. M.I.T., 1897) and Edward A. Merydith joined the Nelson & Buchanan Company as engineers. In 1906, Andrew Buchanan left the firm, which subsequently reorganized as Nelson Construction Company and again in 1908 as Nelson-Merydith Company.[10] Headquartered in Chambersburg, Nelson-Merydith Company built bridges in Pennsylvania, New Jersey, Ohio, Maryland and West Virginia until 1913, when Alexander Nelson left the firm for employment as county engineer in Atlantic County, New Jersey.[11] Edward Merydith subsequently formed his own consulting firm, the Merydith Construction Company.[12]

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[8] The majority of bridges attributed to the company are reinforced concrete arches, but a few metal truss bridges survive as well.
[9] The Pittsburgh Bridge Company was formed in 1878, incorporated in 1881 and absorbed by the American Bridge Company in 1900.
[10] A. Buchanan bid against the Nelson Construction Company for several Franklin County bridge contracts, including this one, in 1907.
[11] "Nelson, Andrew H.," *Who's Who in Pennsylvania*, Volume I (Chicago: A.N. Marquis Company, 1939).
[12] Totman Bridge (ODOT #8437912), a reinforced concrete closed-spandrel deck arch in Washington County, Ohio, was built by Merydith Construction Company in 1915.

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