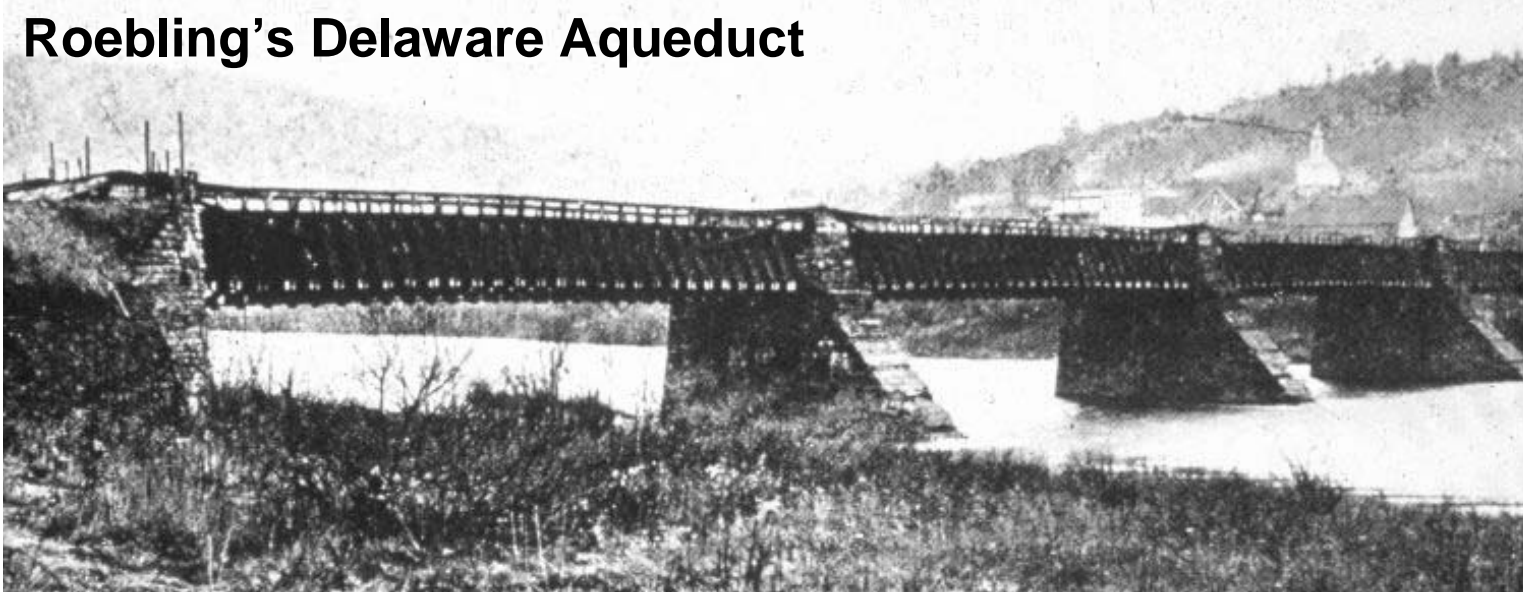




Roebling's Delaware Aqueduct



Upper Delaware Scenic and Recreational River is the home of the oldest existing wire cable suspension bridge in the nation — the Delaware Aqueduct, or Roebling Bridge as it is now known. Begun in 1847 as one of four suspension aqueducts on the Delaware and Hudson Canal, it was designed by and built under the supervision of John A. Roebling, future engineer of the Brooklyn Bridge.

“Build the Canal above the River”

The Delaware and Hudson (D&H) Canal and Gravity Railroad was a transportation system between coal fields of northeastern Pennsylvania and markets on the Hudson River. It operated from 1828 until 1898.

When the D&H Canal was first built, a 16-foot-high slackwater dam was built to form a pool of deep, slow-moving water, which allowed canal boats to safely cross the river. Mules and their drivers crossed the Delaware River on a rope ferry, while canal boats were poled or floated across the river to the guard lock. This slackwater dam and rope ferry crossing of the Delaware River at Lackawaxen had been a major bottleneck from the time of the canal's completion.

Competition from the New York and Erie Railroad and an increased supply of coal encouraged the D&H Canal Company to improve its operations with a series of enlargements beginning in the 1840's.

To alleviate the bottleneck and speed the flow of canal traffic at the Delaware River crossing, the D&H Canal Company approved engineer Russel F. Lord's plan to build two aqueducts. The availability and price of land along the existing route of the canal made it less expensive to reroute the canal across the Lackawaxen River and through Lackawaxen, Pennsylvania.

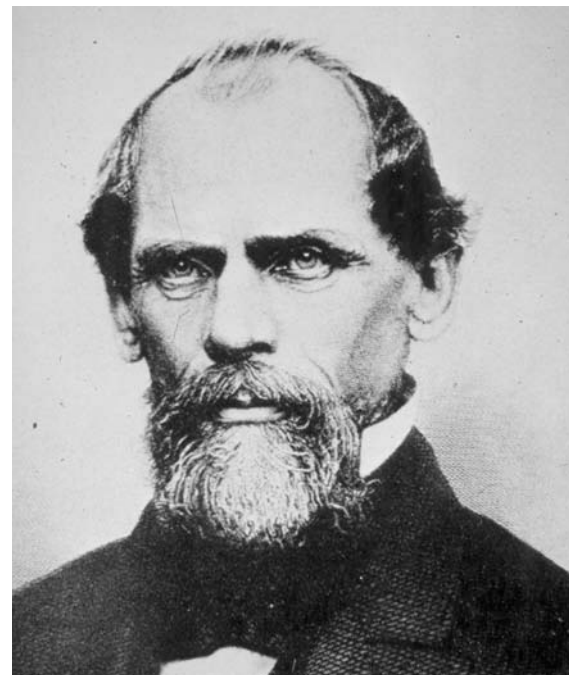
John Roebling's new suspension design was selected for the project. Compared to conventional bridges, Roebling's design allowed more room for ice floes and river traffic to move underneath.

In 1848, the new aqueducts replaced the D&H Canal Company's former means of crossing the Delaware River. Transporting boats above the river reduced the time required to cross the Delaware, making the D&H Canal more competitive with its rivals: the railroads and other canals.

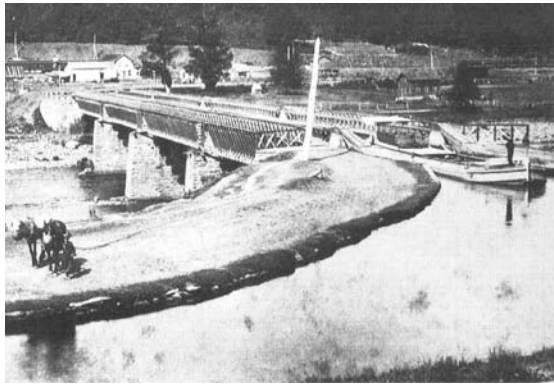
John Augustus Roebling

A German immigrant, and graduate of the Royal Polytechnic School of Berlin, Roebling came to the United States in 1831. It was not until 1845 that he built his first suspension structure. From 1845 until his death in 1869, he designed five major suspension bridges. Two—the Cincinnati-Covington Bridge and the Brooklyn Bridge—are still standing.

John Roebling designed four suspension aqueducts for the D&H Canal: the Delaware and Lackawaxen Aqueducts, the Neversink Aqueduct (Neversink Valley Museum of History & Innovation in Cuddebackville, NY), and the High Falls Aqueduct (D & H Canal Historical Society and Museum in High Falls, NY). After the canal closed in 1898, three were abandoned. The Delaware Aqueduct's strategic location and value as a road bridge prevented its demolition.



From Aqueduct to Road Bridge: Transition and Adaptation



The aqueduct operated for fifty years until the closing of the canal in 1898. It was then converted to a private toll bridge and underwent a series of modifications through the years. Around 1900, new owner Charles Spruks built a tollhouse abutting the New York side of the structure.

Eventually, the towpaths were removed and the wooden trunk walls were dismantled. The

protective icebreakers were not maintained and were destroyed by the river over time.

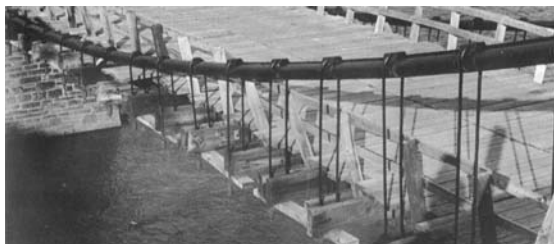
The Delaware Aqueduct continued to function as a vehicular bridge until 1979. In 1980, the National Park Service purchased the aqueduct to be preserved as part of Upper Delaware Scenic and Recreational River.



Restoration



When the National Park Service started restoration work, the primary goal was to preserve the structural integrity of the bridge and as much of the original ironwork as possible. Almost all of the Delaware Aqueduct's existing ironwork — cables, saddles, and suspenders — are the same materials installed when the structure was built. The two suspension cables are made of wrought iron strands, spun on site under the direction of John Roebling in 1847.



Each 8 1/2-inch diameter suspension cable carries 2,150 wires bunched into seven strands. Laboratory tests in 1983 concluded that the cable was still "viable;" some of the wires even exceeded Roebling's original specifications. Roebling's cast iron "pier

saddles" still sit astride the cables as they cross the original stone piers.

The wooden superstructure was replaced about every 25 years by the D&H Canal Company. The last surviving canal era timbers were removed in the 1930's. In 1986, this superstructure was reconstructed using Roebling's original plans and specifications.



In 1968, the Secretary of the Interior designated portions of the D&H Canal including the Delaware Aqueduct as a National Historic Landmark. The Delaware Aqueduct commemorates the canal era and Roebling's contributions to suspension bridge technology.



For More Information

Measured drawings and historic photographs of the Delaware Aqueduct and tollhouse are available through the HABS/HAER collection archived at the Library of Congress.

http://memory.loc.gov/ammem/collections/habs_haer

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