Form No. 10-300 (Rev. 10-74)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED
DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC
The Covington and Cincinnati Suspension Bridge

AND/OR COMMON
The Suspension Bridge

2 LOCATION

STREET & NUMBER
Covington side: Second Street between Greenup and Scott streets
Cincinnati side: Between Walnut and Vine streets
Over the Ohio River
__NOT FOR PUBLICATION

CITY, TOWN
Covington
__ VICINITY OF

CONGRESSIONAL DISTRICT
Fourth District

STATE
Kentucky

CODE
021

COUNTY
Kenton

CODE
117

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	X PUBLIC	__OCCUPIED (not	__AGRICULTURE	__MUSEUM
__BUILDING(S)	__PRIVATE	__UNOCCUPIED applicable)	__COMMERCIAL	__PARK
X STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	__YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	X YES: UNRESTRICTED	__INDUSTRIAL	X TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME
The Commonwealth of Kentucky

STREET & NUMBER
Bureau of Highways, (John C. Roberts, Commissioner), State Office Building

CITY, TOWN
Frankfort
__ VICINITY OF

STATE
Kentucky

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
Hamilton County Courthouse

STREET & NUMBER
Court and Main streets

CITY, TOWN
Cincinnati

STATE
Ohio

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Inventory and Appraisal of Historic Sites, Buildings & Areas

DATE
1960

__FEDERAL __STATE __COUNTY X LOCAL

DEPOSITORY FOR SURVEY RECORDS
City Planning Commission, Cincinnati City Hall, 8th and Plum Street

CITY, TOWN
Cincinnati

STATE
Ohio

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
__EXCELLENT	__DETERIORATED	__UNALTERED	X ORIGINAL SITE
XX GOOD	__RUINS	X ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

(Although plans for a suspension bridge over the Ohio River between Covington, Kentucky and Cincinnati, Ohio were drawn up as early as 1846, it was not until 1856 that work was begun. Even then the project was hampered, first by the notoriously bad winter of 1856-7, then by the financial panic of 1857, and finally by the Civil War. Ironically, it was also because of the war that work was resumed, when it became apparent that such a bridge would greatly facilitate the movement of troops and preparation of defenses. On December 1, 1866, almost exactly four years after work on the project had recommenced, the bridge was opened to the public. One month later it was opened to traffic amid great fanfare. The final touches had not yet been added, however, and it was not until July that the bridge was truly finished).

The center, or river, span of the Covington and Cincinnati Suspension Bridge measures 1,057' while each of the land spans measures 281'. Including the approaches, the total length of the bridge is 2,252'. The deck of the bridge arches slightly, rising from a height of 91' above mean low water at the towers to a height of 100' at the center of the river span. The two masonry towers, from which the cables are hung, each stand 230' above mean low water.

The towers are built upon foundations of heavy oak logs hewn square and laid in the shape of a platform. Each foundation consists of numerous such platforms, or courses of timber, laid in an alternating pattern, bolted together and sealed with concrete. To insure that the timbers do not dry out, neither foundation rises above the low water line. (At the time of construction, 20' high cofferdams were built around each foundation to enable workmen to lay the masonry for each tower's base). The towers themselves, which measure 52' x 82' at the base, are built of limestone and sandstone, the first 25' above the foundations being of Dayton (Ohio) limestone and the remainder, above the first offsets, of rough cut sandstone. The massive scale of the towers, while still pronounced today, was particularly evident at the time of their construction. As Washington Roebling wrote upon his arrival in Cincinnati in 1865:

> The size and magnitude of this work far surpasses any expectations I had formed of it. It is the highest thing in this country; the towers are so high that a person's neck aches looking up at them. It will take me a week to get used to the dimensions of everything around here.

Among the impressive features of the towers are the arches, which stand 30' wide and 75' high, through which the roadway passes.

At either end of the bridge stands an anchorage, a large masonry block consisting primarily of limestone quarried at Portsmouth, Ohio. Buried within

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW				
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
__1600-1699	__ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN
__1700-1799	__ART	X ENGINEERING	__MUSIC	__THEATER
X 1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION
__1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES 1856-1867 BUILDER/ARCHITECT John A. Roebling

STATEMENT OF SIGNIFICANCE

At the time of its completion in 1867, the Covington and Cincinnati Suspension Bridge was unprecedented and unrivaled: its 1,057' span across the Ohio River was the longest in the world. A daring and impressive structure, the bridge demonstrated clearly the genius of its designer and builder, John A. Roebling. Still one of the nation's foremost examples of suspension bridge design, it has weathered more than a century of use and continues to provide a valuable service to the two communities.

John A. Roebling was one of 19th century America's most renowned engineers and bridge builders. Unhappy with the agrarian life he initially chose for himself upon his emigration from Prussia in 1831, he turned to civil engineering, ultimately specializing in the design and construction of suspension bridges. Among his numerous achievements were bridges over the Monongahela River at Pittsburgh (1846), over the Delaware River near Port Jervis, New York (1848), over the gorge of the Niagra River near the famous Falls (1855), and over the Allegheny River at Pittsburgh (1860). Undoubtedly the work most often associated with his name is the Brooklyn Bridge, a structure he planned for many years in his head and on paper, but which he did not live to see built, leaving his son and successor, Colonel Washington A. Roebling, to carry out the actual construction.

Although the Covington and Cincinnati Suspension Bridge has been overshadowed by the Brooklyn Bridge--indeed, it is usually referred to as a step in the development of the plans for the Brooklyn Bridge--it is, in and of itself, a fascinating and outstanding example of the art of bridge building. This is due not only to the size and magnitude of the structure, but also to its carefully conceived and excellently executed system of stays--wire ropes that stabilize and strengthen it. Not satisfied with merely hanging suspenders from the cables, Roebling decided to add, as he had with his bridge over the Niagra, numerous diagonal stays, stringing them from the two towers to various points along the deck of the bridge. As he himself explained:

> The office of these stays is twofold. They not only assist the cables powerfully in the support of the bridge but they also supply the most economical and most efficient means for

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Condit, Carl W., American Building Art: The 19th Century (New York, 1960).

Plowden, David, Bridges (New York, 1974).

Steinman, D.B., The Builders of the Bridge (New York, 1950).

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY _____

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	16	715289	4,330,220
B	16	715,430	4,329,550
C			
D			

VERBAL BOUNDARY DESCRIPTION

The boundaries are comprised of the extremities of the bridge itself, or, the end of the approach on the Covington side and the end of the approach on the Cincinnati side, a total of 2,252'.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
Kentucky	21	Kenton	117
Ohio	39	Hamilton	061

11 FORM PREPARED BY

NAME / TITLE

James B. Armstrong — February 24, 1975

ORGANIZATION — DATE

Historic American Engineering Record, NPS — 202-523-5460

STREET & NUMBER — TELEPHONE

Dept. of the Interior, National Park Service, Washington, D.C.

CITY OR TOWN — STATE

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL ___ STATE ___ LOCAL ___

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

FEDERAL REPRESENTATIVE SIGNATURE

TITLE — DATE

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST: DATE

KEEPER OF THE NATIONAL REGISTER

these anchorages are large cast-iron anchor plates, each weighing more than 11 tons, to which chains made of wrought-iron eyebars, forged under the supervision of John Roebling, are attached. Connected to the ends of the chains are the two iron cables from which the deck of the bridge is suspended.

Each of the cables measures 12 1/2" in diameter and is composed of seven separate strands, each of which is made up of 740 individual wires. This wire was manufactured by Richard Johnson & Brothers, Manchester, England because no American firm could meet Roebling's requirements of quality and quantity. Individual wires were strung between the towers and on down to the anchorages by means of specially designed wheels that traveled back and forth across the river on an endless rope. Once the final wire of the final strand had been strung, or laid up, the seven strands were compressed into a circle and wrapped in galvanized iron wire by means of a machine designed by John Roebling. Located along the cables are numerous wrought-iron bands from which workmen hung the wire rope suspenders that hold up the bridge deck.

In an engineering sense, the most notable aspects of the bridge are the numerous inclined stays that add support and stability to the structure. The bridge was built with 100 wire rope stays 2 1/4" in diameter running from the tops of the towers to various points along the deck; on each side, the three longest of these "overfloor" stays passed over the tower and on down to the anchorage. Each stay was attached to the suspenders it intersected by annealed wire lashings. Not only did they distribute the carrying load more evenly (it was determined that the overfloor stays alone carried almost half the total weight of the roadway and the live load), but the stays helped to drastically reduce vibration. In addition, Roebling also strung eight heavy counter, or check, stays from a point on each tower just below the roadway to the cables themselves. The purpose of these check stays was to counteract the lifting and lateral motion that might result from a particularly strong wind. Further stiffness of the deck was achieved by the addition of two heavy wrought-iron Howe trusses that extended the entire length of the bridge, one on either side of the roadway.

The bridge has undergone a certain amount of alteration and upgrading over the years. The most extensive changes occurred in 1898-9 and included the stringing of two new cables, the widening of the deck, and the replacement of the original stiffening trusses. Under the direction of Wilhelm Hildenbrand, who earlier had worked under Washington Roebling on the building of the Brooklyn Bridge, two steel cables 10 1/2" in diameter were hung directly over Roebling's iron cables; the load was then distributed evenly between the old and new. Also, the width of the deck was increased from 36' to 48', and the iron trusses replaced by steel trusses. In 1954-5, the bridge was given a steel grid floor.

> stiffening the floor. Every stay constitutes the hypotenuse of a rectangular triangle, whose short sides are formed by the tower and the floor....This looks like a very simple proposition indeed, and is readily comprehended by sailors, who are accustomed to stays on board ships....I have always insisted that a suspension bridge built without stays is planned without any regard to stiffness, and consequently is defective in a most important point.

Although it looked to Roebling "like a very simple proposition indeed," his use of stays was not appreciated or even fully understood for many years. As D.B. Steinman, himself a noted bridge engineer, has written:

> The full significance of this comprehensive system of diagonal stays was missed by the rest of the profession at the time. In his penetrating insight into the problem of stiffening a suspension bridge, not only against normal loads but also against destructive undulations producible by wind, Roebling's genius was manifested....it was seventy-five years before modern bridgebuilders grasped the idea and recognized its supreme importance.

The Covington and Cincinnati Suspension Bridge is one of only two bridges designed and built by John Roebling still standing. (The other, near Port Jervis, New York, began life as an aqueduct but was converted to carry vehicular traffic at the turn of the century; a National Historic Landmark, it is generally referred to as the nation's oldest suspension bridge). Although somewhat altered in form, the bridge stands as a fitting tribute to its designer and builder. As it approaches its 110th birthday it continues to function smoothly, and in doing so reveals the precision and foresight with which it was planned and constructed.