

BROOKLYN BRIDGE

HAER No. NY-18

Spanning East River
between Park Row, Manhattan and
Sands Street, Brooklyn
New York, New York County and
Brooklyn, Kings County
New York

HAER
NY,
31-NEYC
90-

Photographs and Descriptive Data

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, D.C. 20240

HISTORIC AMERICAN ENGINEERING RECORD

BROOKLYN BRIDGE
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Location: Spanning 1,595.5 ft. (center to center of towers) over East River between Park Row, Manhattan, and Sands Street, Brooklyn. New York, New York County and Brooklyn, Kings County, New York.

USGS 7.5 Minute Series-Brooklyn, NY
UTM Coordinates: 18.584720.4506400.

Dates of Construction: 1869-1883.

Engineers/Builders: John A. Roebling, designer; Washington A. Roebling, builder.

Present Owner: Commissioner
New York City Department of Transportation
40 Worth Street
New York, New York 10013

Present Use: Continues to provide vehicular and pedestrian access between Brooklyn and Manhattan after 100 years.

Significance: At the time of its opening on May 24, 1883, the Brooklyn Bridge was the longest spanning bridge in the world. It represents the culmination of nearly a lifetime's experience designing and building suspension structures and incorporates the pinnacle of development of design features conceived by John A. Roebling during this period. The Roebling system of suspension bridge construction became the standard for suspension bridges throughout the world. These features included the anchoring system composed of a cast-iron plate buried under masonry to which anchorage chain eyebar links were attached and rose in the curve of a quadrant, the upper ends to which were pinned the looped ends of wire cables; the method of constructing the cables where individual parallel wires were "air spun," consolidated, and wrapped with wire into a solid, cylindrical mass; the diagonal stay cables, radiating from the tower tops down to the deck, a secondary structural feature that gave partial support to the deck and also stabilized the superstructure and cable system against vertical movement in severe winds. The cables were also innovative because it was the first time that steel-wire (galvanized to protect against corrosion) was used in a bridge, and the second time that rolled-steel structural sections were used in a bridge superstructure.

Historian: Other than these cover sheets to the HAER photographs, a historical report or drawings were not prepared because many books have been written about the Brooklyn Bridge and the original drawings are available for reference in the City of New York, Municipal Archives, 52 Chambers Street, New York, NY 10007. What is accepted by most authorities as the standard text is The Great Bridge by David McCullough, Simon & Schuster: New York, 1972.

The Bridge's Vital Statistics¹:

GENERAL

Length of Main Span	1,595.5 ft. (489 m.)
Length of each side span	930.0 ft. (283 m.)
Length of bridge proper	3,455.5 ft. (1,050 m.)
Total length, including approaches	5,989.0 ft. (1,820 m.)
Clear hgt. at mid-span above high water (90F)	135.0 ft. (41.2 m.)
Clear width of bridge	85.0 ft. (25.9 m.)
Grade of roadway	3.25%

CAISSONS

Depth of base below high water - Brooklyn	44.5 ft. (13.6 m.)
New York	78.5 ft. (23.9 m.)

TOWERS

Height above high water	276.6 ft. (84.4 m.)
Height of arches above roadway	117.0 ft. (35.7 m.)
Width of arch openings	33.8 ft. (10.6 m.)
Weight of masonry - Brooklyn	79,000 T.
New York	97,000 T.

ANCHORAGES

Number of anchorage - chain eyebars	1,520
Average size of eyebars	12ft. x 3 in. x 8 in.

CABLES

Number	4
Diameter over wrapping	15.75 in. (40 cm.)
Length of each cable	3,578.5 ft. (1,089 m.)
Number of wires in each cable	5,434
Total length of wire in each cable	3,515 miles
Ultimate strength of each cable	12,314 T.
Weight of each cable	870 T.

SUSPENDERS & DIAGDNAL STAYS

Total number of vertical suspenders	1,520
Ultimate strength of each suspender	70 T.
Total number of diagonal stays	400

TRUSSES & FLODR BEAMS

Number of longitudinal stiffening trusses ²	6
Height of inner and intermediate trusses ²	17.0 ft. (5.2 m.)
Height of outer trusses ²	8.7 ft. (2.7 m.)
Length of floor beams	86.0 ft. (26.2 m.)
Depth of floor beams	32 in. (81.3 cm.)

COSTS

Purchase of land	\$ 3,800,000
Construction	\$11,700,000
Total cost of bridge	\$15,500,000

- 1) Source: Robert M. Vogel, Building Brooklyn Bridge: The Design and Construction, 1867-1883, Smithsonian Institution. Washington, D.C. 1983.
- 2) In the 1953 reconstruction of the suspended superstructure, the intermediate trusses were removed and the outer trusses were raised to the height of the inner trusses.

ADDENDUM TO
BROOKLYN BRIDGE
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New York County
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BLACK & WHITE PHOTOGRAPHS

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