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

DATA SHEET

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
RECEIVED OCT 21 1975
DATE ENTERED JAN 21 1976

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

1 NAME

HISTORIC: Mount Hope Bridge

AND/OR COMMON: Mount Hope Bridge

2 LOCATION

STREET & NUMBER: State Route 114 over Narragansett Bay — NOT FOR PUBLICATION

CITY, TOWN: Bristol / Portsmouth — VICINITY OF

CONGRESSIONAL DISTRICT: 1

STATE: Rhode Island — CODE: 44

COUNTY: ~~Bristol/Newport~~ Fernand St. Germain — CODE: 005

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	XPUBLIC	__OCCUPIED	__AGRICULTURE	__MUSEUM
__BUILDING(S)	__PRIVATE	__UNOCCUPIED	__COMMERCIAL	__PARK
XSTRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	__YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	XYES: UNRESTRICTED	__INDUSTRIAL	XTRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME: Rhode Island Turnpike and Bridge Authority

STREET & NUMBER: P. O. Box 437

CITY, TOWN: Jamestown — VICINITY OF — STATE: Rhode Island, 02835

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.: Bristol Town Hall

STREET & NUMBER: 10 Court Street

CITY, TOWN: Bristol — STATE

COURTHOUSE, REGISTRY OF DEEDS, ETC.: Portsmouth Town Hall

STREET & NUMBER: 2200 East Main Road

CITY, TOWN: Portsmouth — STATE: Rhode Island

6 REPRESENTATION IN EXISTING SURVEYS

TITLE: New England, An Inventory of Historic Engineering and Industrial Sites

DATE: 1974 — XFEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS: Historic American Engineering Record, National Park Service

CITY, TOWN: Washington — STATE: D. C. 20240

(see continuation sheet #1)

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
X EXCELLENT	__DETERIORATED	X UNALTERED	X ORIGINAL SITE
__GOOD	__RUINS	__ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

The Mount Hope Bridge, designed in 1927 by Robinson and Steinman, and built under their supervision in the following two years, is a prize-winning suspension bridge over Narragansett Bay between Providence and Newport, Rhode Island. With a main span of 1200 feet, the Mount Hope Bridge, until surpassed only in this past decade, was the longest suspension bridge in New England. Originally built for the Mount Hope Bridge Company as a privately owned toll bridge, it was purchased by the State of Rhode Island in 1955 and is now administered by the Rhode Island Turnpike and Bridge Authority, which succeeded the Mount Hope Bridge Authority in 1964.

Historically, the Mount Hope Bridge links the Providence Plantations, settled by Roger Williams in 1636, and the Island of Rhode Island, originally called Aquidneck, to the south, which was settled by John Clarke in 1638. The present bridge is located at the point of narrowest water gap between the present-day towns of Bristol and Portsmouth, the site of what has been an important transportation link since Colonial times. At nearby Mount Hope, now located within the township of Bristol, the Wampanoag Indian chief, King Philip, planned the Indian attacks that in 1675 and 1676 devastated the villages of Massachusetts and Rhode Island. Tradition indicates that the first ferry was established between Bristol, which until 1747 was a part of Plymouth Colony, and the Island of Rhode Island in about the year 1676, preceding the date of the settlement of the town of Bristol by four years. John Tripp of Portsmouth was the first ferryman, taking Captain Benjamin Church and his men to the mainland at various times to engage in the Indian uprising that finally resulted in the death of King Philip. Later, John Borden and Ralph Earle, two of the early settlers of Portsmouth, served as ferrymen at a time when simple sail or row boats plied the route. During the Revolution, the ferry provided transportation for many notables of the American Army, including Washington, LaFayette, and Rochambeau. About 1824 a boat propelled by horses was put into service on the line. The animals kept the boat in motion by walking on a rounded platform, which through a system of cogs and shafts, actuated the paddlewheels. This ferry was operated by an organized, incorporated company; the machine which propelled the boat by the aid of horses being a patented device. Sailboats also continued in use as ferries at this time, as rough weather and/or ice often hindered the horse-powered vessel.

(See continuation sheet #1A)

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
__1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	X TRANSPORTATION
X 1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES 1927 - 1929

BUILDER/ARCHITECT

Robinson and Steinman, Consulting Engineers
Theodore E. Blake, Architect
Howe and Church, Architects

STATEMENT OF SIGNIFICANCE

Dr. David B. Steinman was an internationally eminent bridge engineer; the designer of over four-hundred bridges of all types on five continents. Manhattan-born, (1887-1960), he received his B. S. degree, summa cum laude, from the College of the City of New York, and his C. E., A. M., and Ph. D. degrees from Columbia University. Teaching at the University of Idaho at age twenty-three, Steinman was the youngest college professor in America. He founded the engineering school at the College of the City of New York, lectured before college and professional audiences across the country, and became a recognized spokesman and leader of his profession. He was instrumental in founding the National Society of Professional Engineers. Formerly over ninety older technical societies served to emphasize the division of the profession into many branches. Steinman's purpose in forming a national professional organization was for the advancement of the engineering profession as a whole. He was a co-author of a biography of the Roeblings, "The Builders of the Bridge", and authored a number of works on bridge engineering and design which became standards, both here and abroad. A large number of technical papers and professional articles also came from his hand. During the height of his career, beginning in 1938, David Steinman began a scientific quest for a bridge design which would insure perfect safety even against earthquake and tornado forces. That search was to extend over a seventeen-year period, culminating in the design of the bridge which joins the upper and lower portions of Michigan, the Mackinac Bridge. Measuring 8,614 feet from anchorage to anchorage, with a central span of 3,800 feet, this "perfectly aerodynamically stable" bridge is David Steinman's and his firm's crowning achievement. He established the David B. Steinman Foundation which continues to bestow grants for education, research, and student aid. A recipient of numerous awards throughout his career, Dr. Steinman achieved worldwide recognition as an

(see continuation sheet #10)

9 MAJOR BIBLIOGRAPHICAL REFERENCES

Ratigan, William. Highways Over Broad Waters. 1st ed. Grand Rapids, Michigan: William B. Eerdmans Publishing Company, 1959.

Steinman, Boynton, Gronquist, and London, Consulting Engineers. Bridges, Structures, and Highways, 1965.

Bristol Phoenix, (Bristol, R. I.), 22, 25 October 1929.

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY Approximately 9.4 acres

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	19	311420	4612890
B	19	312250	4611550
C	19	311700	4611060
D	19	312000	4612600

VERBAL BOUNDARY DESCRIPTION

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

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE
Lombard John Pozzi, Consultant Architect

ORGANIZATION
Rhode Island Historical Preservation Commission

DATE
June 23, 1975

STREET & NUMBER
1226 Hope Street

TELEPHONE
401-253-7979

CITY OR TOWN
Bristol

STATE
Rhode Island, 02809

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL X 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 State Historic Preservation Officer DATE October 14, 1975

FOR NPS USE ONLY

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

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION DATE 11/3/76

ATTEST: DATE 1'29'76

KEEPER OF THE NATIONAL REGISTER

Acting

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

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

Title: Bristol In-Depth Survey

Date: 1975 State

Depository for Survey Records: Rhode Island Historical Preservation Commission
150 Benefit Street

City, Town: Providence, Rhode Island 02903

Form No. 10-300a
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In the early 1840's the Fall River Iron Works Company established a steamboat line between Fall River and Providence, with stops at Bristol Ferry on the Portsmouth side and at the foot of State Street in Bristol proper. By mid 1840's, the horse powered ferries had ceased to be profitable and were removed from the line. In 1845, the steamboat Bradford Durfee was placed into service, followed later by the Canonicus and the Richard Borden. The steamboats of the Fall River-Providence-Newport line ceased to make stops at Bristol Ferry at the northern end of the Island of Rhode Island about 1903. At that time or shortly thereafter, the Newport and Providence Railway Company placed the steamer Sagamore on the line from new slips located at the foot of Thames Street near Constitution Street in Bristol and at Bristol Ferry on the Aquidneck side. This formed a continuous transportation link in Bristol at the Constitution Street Depot of the New York, New Haven, and Hartford Railroad, where trains could be boarded for Providence and points beyond, and with the electric trolley to Newport on Aquidneck. In 1905, the steamboat Bristol was placed in service. Later, when the trolleys were succeeded by buses, the Bristol terminus was again relocated to the original location at the end of the present Ferry Road. By the 1920's many automobiles were being carried over the revived shorter route. Starting in 1927, the Conanicut alternated with the Bristol on the ferry line until the opening of the Mount Hope Bridge in 1929 ended the ferry service.

The original resolution sponsored by William L. Connery of Bristol in the Rhode Island General Assembly on March 9, 1920, calling for a joint committee to investigate the desirability of locating a bridge between Bristol and Portsmouth, was born of a relatively unimportant incident - the occasional tardiness of legislators from Newport County at sessions of the General Assembly. During periods when the severe freezing of Bristol Harbor prohibited the ferry from making its run, these legislators had to travel by train through Fall River and thence to Providence, making them late for the sessions of the General Assembly. However, after an investigation of the proposed endeavour, it was felt that it was not in the best financial interests of Rhode Island to finance so large a project at that time.

(see continuation sheet #2)

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Colonel Samuel Pomeroy Colt, a nephew of the arms inventor and founder of the Industrial National Bank, was one of the first of Rhode Island's leading citizens who looked upon the Mount Hope Toll Bridge as a feasible proposition that should be constructed by the State, and cited many economic advantages that would accrue to the whole State.

By the mid 1920's, the tremendous development of vehicular traffic coupled with an unusually rapid influx of tourist traffic from the west into New England, and the increasing need for a direct communications link between the two major cities of the State, finally culminated in a proposal by Representative Herbert Smith of Newport to place the proposition on the ballot as a State-financed endeavour in the autumn of 1926. As the Island of Rhode Island was the only area in the State to show an increase in the number of farms between 1920 and 1925, it was further felt that the benefit of the surpluses produced should accrue to Rhode Island proper rather than the nearby areas of Massachusetts to the east. It was argued that the public was in fact indirectly paying for the inconvenience of the ferry in the form of tolls, lost time, and/or the cost of travel over the eight-and-a-half mile longer route between Providence and Newport via Fall River.

In 1926, the Mount Hope Bridge Commission was formed with Herbert W. Smith as Chairman. Under State Highway Engineer George H. Henderson and Bridge Engineer Daniel O. Cargill, a cantilever design was proposed. Originally planned to accommodate a forty foot-wide roadway with sidewalks to either side, the initial design furthermore provided for the possibility of the later addition of a lower deck to carry either two additional lanes of traffic or railroad trackage. Even though this initial proposal for a high level bridge was located in the most economical position and was particularly adapted to the existing approaching streets, the Rhode Island lawmakers in early 1927 refused to vote the appropriation at an estimated cost of $6,000,000.

Dr. David B. Steinman, the noted bridge engineer, heard of the proposed Mount Hope Bridge in 1926, and became intrigued by its possibilities. He made a small sketch of an unusually attractive suspension bridge for the crossing with cost estimates and presented

(see continuation sheet #3)

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this to the aforementioned engineers; however, because the Mount Hope Bridge Commission was developing the plans of the cantilever bridge at that time, the matter was dropped.

Following the financial rejection by the State legislature, the interested banking houses during that boom period decided to finance the project as a privately-owned toll bridge. Herbert Smith continued to advocate the span, both as a public official and as a private citizen, finally obtaining State authorization to permit private capital to erect a bridge and charge tolls for a specified maximum period of time.

An inquiry was made to David Steinman whether the bridge could be built for $4,000,000.; his response being that it could be built for $3,000,000., and perhaps even less. The final cost of the Mount Hope Bridge, excluding financing charges, was $2,500,000. The total cost including bonds, debentures, and common stock was $4,250,000.

Although the water gap at Bristol Ferry is 3,000 feet, Robinson and Steinman bridged the crossing with a main suspension span of only 1,200 feet; this being possible by the use of long side spans, cable bents with straight backstays, and locating the south anchorage on clay in shallow water instead of further back on shore. David Steinman's then-novel use of cable bents at the ends of the side spans permitted the anchorages to be less massive and to be located further shoreward on higher ground. This expedient alone saved $850,000 in cost of the Mount Hope Bridge and proportionally more on subsequent suspension bridges.

The plans and specifications for the new bridge were authorized on August 1, 1927, and completed a month-and-a-half later. The contract was awarded December 1, 1927, and field work commenced on December 16, 1927. Completion came nearly two years later on October 24, 1929. Statistically, the Mount Hope Bridge is of the wire cable suspension type with steel viaduct approaches; the total length of the bridge is 6,130 feet, with the height of the main towers above the water being 285 feet. The deepest foundation extends 54 feet below sea level, and the clear height below the 1,200 foot main span is 135 feet. The cables measure eleven inches in diameter and consist of 2,450 galvanized, cold drawn,

(see continuation sheet #4)

number six wires in each cable. The design loading is 6,800 pounds per square foot, assuming a maximum live load of three lines of twenty ton trucks. The total load on each of the two main piers is 5,600 tons.

Robinson and Steinman, the principal designers of the bridge, ✓ engaged New York architect Theodore E. Blake (1870 - 1949) in an advisory capacity in connection with the architectural design of the bridge itself and, in addition, for the design of the toll-booth structure on the Bristol side of the bridge and of the guardhouse at the opposite side. Having studied at the Ecole des Beaux Arts in Paris, Theodore Blake later became an associate architect with Carrère and Hastings. Architect Blake was the chief designer of the Senate and House office buildings in Washington, D. C., and was one of the designers of Carrère and Hastings of the New York Public Library at forty-second street in that city. In a similar capacity, he also worked on the Manhattan Bridge project, under foremost bridge engineer Gustav Lindenthal, Steinman's early employer. In later years, Theodore Blake served as Consulting Architect to the firm of Robinson and Steinman.

✓ The local architectural firm, Howe and Church, was retained by Robinson and Steinman for the remodelling of an existing structure on the premises to serve as the office and manager's residence, and for the erection of a new service building. Historically, the somewhat formal Colonial Revival summer house, known as "Dr. Jones' Place," dates from about the turn of the century. As Wallis E. Howe began to receive commissions from his native Bristol as early as 1895 while a draughtsman in the Providence office of Martin and Hall, the original building for Dr. Jones may have been designed chiefly by him, as the nature of the firm's work during this period was mainly residential in character. Samuel Church began his practice about the year 1906. Wallis E. Howe, with Prescott O. Clark, designed the Providence Post Office, Court House, and Custom House in 1905 - 1906 through the running of a national competition; and in 1908 the firm Clark, Howe, and Homer, and Samuel Church, Associated Architect, designed the modest Benjamin Church Home for Aged Men in Bristol, presently included in the National Register of Historic Places.

The Dr. Jones house was originally a weathered shingled building; Howe and Church painted its exterior when they remodelled it in 1928 to serve as the Mount Hope Bridge Administration Office, a function it still serves today.

(See continuation sheet #5)

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The "West House", a large two-and-a-half story structure with a number of ells, also stood nearby the Bristol approach and served as the main building of Ferry Farm. Built in 1749 by the Pearce family, it was sold to Captain William H. West during the Civil War. The structure is not standing today.

The General Contractor for the Mount Hope Bridge, the McClintic-Marshall Company, was responsible for the steel superstructure. Under that firm's supervision, thirty subcontractors were also engaged on the project. These chiefly included the Foundation Company (substructure over water), the Keystone State Corporation (cable construction), the Callan Construction Company (substructure at Bristol approach), Wescott and Munroe (substructure at Portsmouth approach), the Huges-Foulkrod Company (concrete deck, toll house, and guard house), Scannevin and Potter (electrical work), the American Bridge Company (eyebars), and the American Cable Company (cable wire and suspender rope). Structural steel was provided by both the Bethlehem Steel Company and the Carnegie Steel Company with iron castings being provided by the Keystone Foundry Company. The Fall River Granite and Quarry Company supplied the granite. Painting was done by the Industrial Paint Company and the landscaping of the approaches by Wadley and Smythe.

While the Mount Hope Bridge was under construction, the American Cable Company developed a new heat-treated, high-carbon steel wire for the cables of the Detroit - Ambassador Bridge across the Detroit River to Canada, the McClintic-Marshall Company having been awarded the steelwork contract for both jobs. The American Cable Company, in order to save retooling their plant and to avoid the confusion of having two different types of wire, cold-drawn and heat-treated, under production and stockpiled in their plant at the same time, urged Robinson and Steinman to accept the new wire for the Mount Hope Bridge. Although the new wire was stronger than the old cold-drawn wire, 190,000 pounds per square inch instead of 140,000 pounds, thereby offering a reduction in the amount of wire required and hence in cost, David Steinman was opposed to the use of the material because its yield strength was so close to the ultimate strength. The margin below the ultimate strength of 220,000 pounds per square inch would have been reduced from 80,000 to 30,000 pounds per square inch. However, as Holton Robinson had been retained as a consultant for the cable erection of the Detroit River Bridge, Louis N. Gross, the chief

(see continuation sheet #6)

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engineer of the American Cable Company, after extensive tests was able to convince Steinman's partner of the soundness of the qualities of the new wire. Because of Holton Robinson's superior experience in cable construction dating from 1887, Steinman acquiesced. Although David Steinman stipulated that the total cross-sectional area of the cables not be reduced in size, thereby nullifying any cost savings, he further required that the principal contractor, the McClintic-Marshall Company, submit a statement guaranteeing the new material. Curiously, after the new wire had been accepted, it was learned that one precaution was necessary; before each wire was looped around its respective seventeen-inch diameter strand shoe at each anchorage, that portion of the wire had to be preformed by curving it full-circle around a grooved wheel of one-half the diameter. This was to neutralize the bending stresses in the wire as it curved around the strand shoe. Cold-drawn wire, which is more ductile and therefore able to relieve bending stresses at points of eccentric strain by a "flow"of the metal, needed no such special handling and attention.

While in Portland, Oregon, supervising the initial construction stages of the St. John's Bridge, Steinman received an urgent call from William Grove, his chief engineer, relaying that wire breaks were occurring in the strand shoes faster than they could be spliced. Steinman ordered concrete torn out to enlarge the working space in the anchorages for the men doing the splicing, and quickly secured a quantity of standard cold-drawn wire to replace the defective wire around the strand shoes. Working around the clock, the bridge crews finally caught up with the speed of the breaks until the process was halted. The same problem had been occurring, with additional breaks at the cable bands along the lengths of the cables, at the Detroit-Ambassador Bridge. This fact, however, was never made public until Steinman condemned the Mount Hope Bridge cables and gave the full data to the newspapers and the "Engineering News Record". A week later, in a note shifting the blame to "trouble that had developed on a bridge in New England using similar cable material", Modjeski, Masters, and Chase, engineers for the Detroit-Ambassador Bridge, similarly condemned their cabling.

At the time of the condemnation of the cables on February 22,1929, the Mount Hope Bridge was only four months from its projected completion date. Following the initial stringing of the cables, the

(see continuation sheet #7)

stiffening trusses had been hung and riveted, the steel floor beams and stringers had been installed, and the wooden forms for the pouring of the concrete roadway had been set in place. The dismantling and re-erection of this portion of the work which ensued during the following months cost the McClintic-Marshall Company a million dollars. Because of Steinman's insistence of a written guarantee, the Mount Hope Bridge Company was spared this loss. The magnitude of the dismantling and re-erection process may be grasped by the fact that the bridge opened to the public fully four months late, during the fourth week of October 1929. The American Cable Company who developed, tested, and furnished the new heat-treated wire shortly went out of business.

Five days following the pageant which marked the opening of the bridge to motor traffic, the stock market failure of Tuesday, October 29, 1929, occurred. It was the optimistic boom period of the mid 1920's which spawned the private financing of the Mount Hope Bridge project, and upon opening, toll revenues far exceeded estimates. However, in the depression which followed, the revenues for the year 1931 dropped and the Mount Hope Bridge Company defaulted on the interest account of the first mortgage bonds and the debentures. As part of a financial reorganization to scale down the carrying charges, a public auction was held on June 1, 1932. Under R. F. Haffenreffer, the Mount Hope Bridge Corporation, representing the bond holders, purchased the property, thereby reducing the bonded indebtedness against the span from $4,150,000. plus $100,000 of outstanding preferred stock to $2,850,000 plus the outstanding stock.

In 1936, the Rhode Island voters turned down a referendum which would have enabled the State to purchase the bridge, most likely because the bridge was to ultimately pass to the State free of all charges on January 1, 1970, under terms of the 1927 act incorporating the Mount Hope Bridge Company, as well as because of economic conditions at that time. Another refinancing of the bridge occurred in 1946 in the amount of $1,700,000,. this indebtedness being completely paid off in 1953. The following year, Rhode Island Governor Dennis J. Roberts signed into law a bill creating the Mount Hope Bridge Authority. The five man commission set up by this bill was ultimately successful in reaching an

(see continuation sheet #8)

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agreement, whereupon the Mount Hope Bridge Authority assumed ownership from the private Mount Hope Bridge Corporation on November 1,1955. On June 1, 1964, the Rhode Island Turnpike and Bridge Authority assumed control of the bridge and today is responsible for the administration of two of the three bridges which span Narragansett Bay, i.e. the Mount Hope Bridge and the new Newport Bridge; the third bridge, the Saunderstown-Jamestown Bridge, is under the jurisdiction of the State Department of Transportation.

From its completion until the present, the firm Robinson and Steinman, today Steinman, Boynton, Gronquist, and London, have been retained as consulting engineers in connection with the annual inspections and maintenance of the Mount Hope Bridge. Both Carl H. Gronquist and Consultant Raymond M. Boynton assisted in the design and construction of the bridge. No major changes have occurred in the forty-six years since the bridge was opened, however, the original "light greenish tint" chosen by Dr. Steinman has since been darkened to a more definite green. Within the past decade, the firm has also reinforced the approach girders.

The future of the span is uncertain, however, as the State has been recommending the construction of an "east shore expressway" since the mid 1950's. Beginning in Washington County in the southerly part of the State, the proposed path would incorporate the Saunderstown-Jamestown and Newport Bridges in its route and thence join Interstate 195 in nearby Massachusetts, either via the Mount Hope Bridge through Bristol and Warren, Rhode Island, and Swansea, Massachusetts, or via the Sakonnet Bridge through Tiverton, Rhode Island, and Fall River, Massachusetts.

The Mount Hope Bridge today still adequately fulfills its original goal of serving auto traffic, even though it is essentially a one lane thoroughfare in each direction, having a total roadway width of twenty-seven feet. The opening of Interstate 195 and improvement of Route 24 between Providence and Tiverton, Rhode Island, via Fall River, Massachusetts, has since provided a good transportation link serving through traffic between Providence and Newport. Proposals relative to increasing the capacity of the Mount Hope Bridge have ranged from "double decking" the existing bridge to erecting a "twin" bridge alongside Steinman's original. While the latter proposal does not materially alter the bridge, a

(see continuation sheet #9)

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large measure of its dynamic and graceful impact would be lost. Should the East Shore Expressway ultimately be constructed utilizing the Bristol-Warren route, it is the recommendation of this consultant that the Bristol Ferry water gap be relinked by means of a tunnel connection, thereby maintaining the dynamic and esthetic qualities of this award-winning bridge.

engineer, scientist, mathematician, inventor, bridge builder, lecturer, and author.

Steinman began practice in July 1914 as a special assistant to Dr. Gustav Lindenthal, then the world's foremost bridge designer. During the next three years, he assisted in the design of two heavy railroad bridges, the Hell Gate Arch Bridge over the East River at New York, which established a new record for an arch span, and the Sciotoville Bridge over the Ohio River between Kentucky and Ohio, which today remains the model example and prototype for long, continuous-truss bridges in the United States. The present firm was founded in 1921 by D. B. Steinman as sole owner; in 1923 it became a partnership with Holton D. Robinson. Upon the death of senior partner Robinson, David Steinman again became sole owner with R. M. Boynton, C. H. Gronquist, and J. London as Associate Engineers. In January 1960, the Associate Engineers became partners, and the firm name Steinman, Boynton, Gronquist, and London was adopted. The firm has continued in practice without reorganization or interruption since the death of Dr. Steinman in August, 1960.

Briefly, a number of the outstanding bridges erected by the firm between 1921-1960, and their contributions to the science of bridge engineering are as follows:

a). Roundout Bridge, New York, (1921-1922) - first suspension bridge with a concrete floor

b). Florianopolis Bridge, Brazil, (1920-1926) - longest eyebar suspension span in the world and largest bridge on that continent. This bridge employs a unique system of suspension construction.

c). Carquinez Strait Bridge, California, (1923-1927) - first bridge designed to resist earthquake forces, set a new record for speed of erection, longest cantilever-type bridge at time of construction.

d). St. John's Bridge, Oregon, (1928-1931) - the longest suspension bridge in the world with rope-strand cables at the time of construction.

e). Waldo-Hancock Bridge, Maine, (1929-1931) - economical high-level suspension bridge designed with main towers as Vierendeel trusses, new anchorage details, and non-adjustable suspender construction. By saving fully one-third of the appropriation through economics of design, the Verona Island Bridge was erected over the secondary channel designed by the same firm.

(see continuation sheet #11)

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f). Henry-Hudson Bridge, New York, (1934-1936) - originally designed by David Steinman as his thesis for his C. E. degree at Columbia University in 1908-1909, this bridge was the longest hingeless arch in the world at the time of construction.

g). Thousand Islands International Bridge, Canada/U. S. A., (1936-1938) - employed unique triple function pier, cable anchorage, arch abutment, pylon support, and improved splayed cable anchorages.

h). Brooklyn Bridge Reconstruction, New York, (1948-1953) - sensitive strengthening and increasing of highway capacity from two to six lanes without loss of artistic effect or historic tradition.

i). Mackinac Bridge, Michigan, (1950-1958) - first major long-span suspension bridge designed for complete and assured aerodynamic stability.

The significance of the Mount Hope Bridge, (1927-1929), is multifold. As previously indicated, the use of long side spans, cable bents with straight backstays, and the use of cable bents at the ends of the side spans afforded novel economies of design. Four 150-foot-long girders were used in its construction, the longest ever fabricated up until that time. New time records were established. The suspended steel spans of the Mount Hope Bridge were erected in a scant thirteen days, as compared to a total construction time of thirteen years for the Brooklyn Bridge built fifty years previously. The Mount Hope Bridge introduced the use of color in bridges. Prior to this, all steel spans had been painted either black or battleship gray. David Steinman selected a "light greenish tint" for the bridge to harmonize with the landscape. In later bridges, Steinman became bolder in his deepening shades of green, progressing from verde green, jade green, apple green, foliage green, and forest green. His ideas were adopted throughout the country and abroad, and in later works, two-color combinations were introduced. Also commencing with the Mount Hope Bridge, David Steinman introduced the use of artistic lighting in order to accentuate the beauty of the span at night, thereby pinpointing the cables with lights and delineating the highway with lights seen through sapphire tinted glass. This measure was also soon adopted by other engineers. Because of the economies of the design, Steinman was further able to persuade the bankers to appropriate an additional $70,000 to landscape the approaches to the bridge.

(see continuation sheet #12)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

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Several twenty-five-foot-high young linden trees were planted near the administration building, and numerous fifteen-to-twenty-foot-high cedar trees were positioned along the approaches. Banks of roses also embellished the roadways leading to the bridge proper.

Finally, the Mount Hope Bridge was awarded the 1929 Artistic Bridge Award of the American Institute of Steel Construction as the most beautiful long-span bridge completed that year. Herbert W. Smith, today remembered as "The Father of the Mount Hope Bridge" because of his early efforts in promoting the Mount Hope Bridge project and services as Vice President of the Mount Hope Bridge Company, accepted the award on behalf of the citizens of Rhode Island in ceremonies held on the bridge on November 10, 1930. In announcing the 1929 Artistic Bridge Award, Dr. J. Horace McFarland, President of the Pennsylvania Fine Arts Commission, wrote: "The Mount Hope Bridge commended itself to the Jury because of its sheer grace. ....The designer of this bridge must have had very clearly in mind the quality of beauty in addition to the essential factors of strength, stability, and endurance.... There is the inevitable feeling of eye and mind which an object of sheer beauty gives."

In conclusion, the Mount Hope Bridge is recommended for inclusion in the National Register of Historic Places because of the importance of this structure in the evolution of the technology and esthetics of bridge building, because of the remarkable number of "firsts" associated with the bridge, and because it today remains essentially as it was built and a landmark to all Rhode Islanders.