

# Historic Bridge Bulletin

## Welcome To Our First Digital Newsletter

**By Paul Brandenburg, Board President of the Historic Bridge Foundation**

Welcome to the new electronic edition of the Historic Bridge Foundation newsletter--*Historic Bridge Bulletin*. Providing relevant information and education regarding all aspects of historic bridges has always been at the core of our mission. Earlier this year, the Board jumped at the opportunity to restart the "publication" of a newsletter using the latest electronic technology. We were further encouraged by the response received when we requested articles for publication. We now have commitments to complete the first three newsletters. We enjoy hearing about your work with historic bridges. Please consider sharing your experiences by contributing an article for future newsletters. Clearly a project of this magnitude does not happen by itself and I thank Kitty for the excellent work as Executive Director and Nathan as Editor for the *Historic Bridge Bulletin* in producing a quality product for your review in record time.

## Chicago's Movable Highway Bridges A Mixed Preservation Commitment

**By Nathan Holth**

Chicago has been said to have more movable bridges than any other city in the world. Many of these bridges have historic significance. Bascule bridges designed in Chicago influenced the thinking and design of bridges across the country when city engineers pioneered the common use of the fixed trunnion bascule bridge. The fixed trunnion design is noted for its simplicity as each leaf rotates around a single trunnion, and this type also works nicely where unstable soil conditions exist since the

bridge maintains the same center of gravity in all operating positions. Today, across the country, the fixed trunnion is one of the two most common types of bascule bridge, the other common type being the Scherzer-style rolling lift bascule which include leaves that roll back on a track and have a variable center of gravity during operation. Additionally, many of Chicago's bascule bridges are notable for their aesthetic details, including significant styles such as Beaux-Arts and Art Deco. Visitors to the city almost certainly see at least some of these bridges when they tour the



**Bas-relief sculpture on Chicago's Ashland Avenue Bridge. Photo by Nathan Holth.**

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If you would like to write an article, please let us know and we will send you the requirements. The Historic Bridge Foundation is the national advocacy organization for the preservation of historic bridges in the United States. Visit our website to learn more at [www.historicbridgefoundation.com](http://www.historicbridgefoundation.com).

The *Historic Bridge Bulletin* is edited by Nathan Holth under the direction of Kitty Henderson, Executive Director of the Historic Bridge Foundation.

downtown area. For the most part, the historic bascule bridges in the downtown “Loop” area of Chicago have been maintained and rehabilitated in a manner that is intended to retain the original appearance and function of the bridges’ historic significance.

Despite there being eighteen bascule bridges in the downtown Loop area, a bascule bridge has not been demolished here since 1984. Only two bridges in the

downtown Loop area date to after the 1960s. Projects involving the bridges in the Loop vary in scope from painting projects to heavy rehabilitation. The rehabilitation of the Wells Street Bridge from 2012-2013 was very extensive and is more of an example of historic replication rather than restoration.

With this rather creative project, the outer panels of each bascule leaf were removed completely and replaced with near-replicas. The new sections replicate the appearance and dimensions of the original sections in nearly every way, with the exception of floor beam design and use of bolts instead of rivets. The project was a challenge to complete because the bridge is a double-deck bridge

that carries vehicles on a lower deck and Chicago Transit Authority “L” trains on top, yet total closures for trains were limited only for a couple weeks for the entire project duration. On a similar note, projects involving historic bascule bridges on Cermak Road and Kinzie Street saw most of the riveted trusses replaced with bolted replicas.

In some cases, Chicago has made a particular effort to return bridges to their original glory. Many of the bridges in the Loop were originally designed with substantial ornamental details. Unfortunately, the original ornate railings on a number of bridges were replaced years ago with utilitarian railings. Recently, Chicago has



**Original railing detail on Michigan Avenue Bridge.**

*Photo by Nathan Holth.*



**The Wells Street Bridge shown here in its raised position, before rehabilitation.** *Photo by Nathan Holth.*

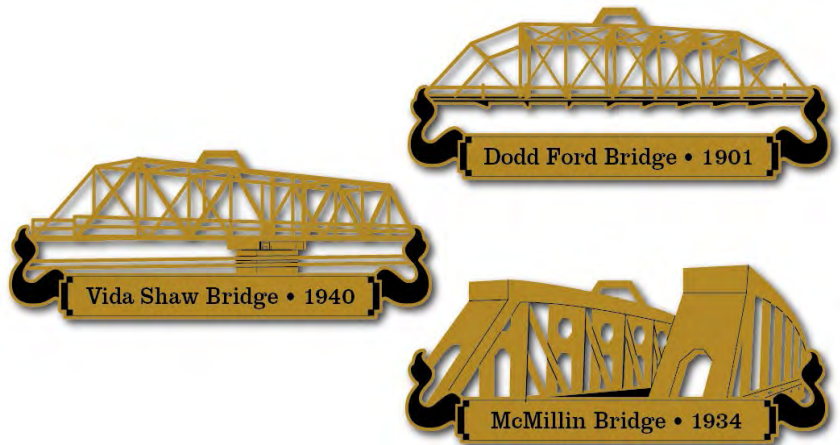


## The Historic Bridge Foundation

### Historic Bridge Collector's Ornaments

These historic bridge ornaments represent three bridges the Historic Bridge Foundation has been working to preserve over the past several years: the Dodd Ford Bridge, a 1901 pin-connected Pratt through truss near Amboy, Minnesota; the 1934 McMillin Bridge, one of only three concrete through trusses in the nation located in Pierce County, Washington; and the Vida Shaw Bridge, which was built in 1940 and is one of only two remaining rim-bearing swing bridges in Louisiana.

Each ornament comes in perma-suede folder with a certificate that provides details on the bridge and its history. Each ornament is available for a \$50 donation to HBF. For more information or to order, contact Kitty Henderson, 512-407-8898, [kitty@historicbridgefoundation.com](mailto:kitty@historicbridgefoundation.com)



been removing those railings and replacing them with new railings that replicate the original railings on the bridges. Perhaps the most visible example of this is installation of replica sidewalk railings on the upper deck of the famous double deck Michigan Avenue Bridge (officially renamed the DuSable Bridge) in 2009. The Michigan Avenue Bridge is noted for its four large ornamental bridge tender houses that are located at each corner of the bridge and feature bas-relief sculptures commemorating important events in Chicago's history. Careful observers will note that the railings for the sidewalk on the lower deck of this bridge were not replaced with the ornamental railings. This helps tell the story

of the bridge's history and prevents creating a false sense of history. As originally built, the bridge's lower deck did not have a sidewalk. The lower deck sidewalks were added at a later date and were not part of the original design.

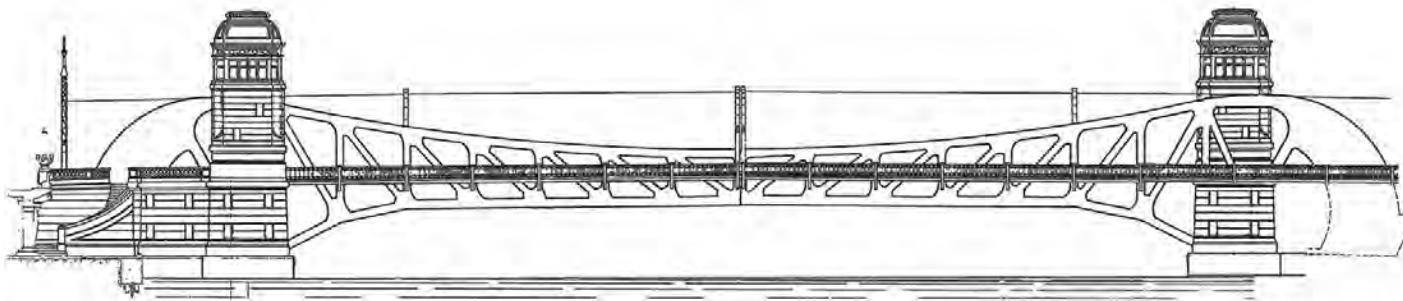
In contrast, the story of historic bridge preservation north of the Loop is, with a couple exceptions, less positive. Here is where, for many years, the oldest fixed trunnion bascule bridges in the city survived. The first fixed trunnion bascule ever built in the city, the Cortland Street Bridge, has been rehabilitated and preserved and additional work to maintain the bridge is planned in the future. Otherwise, the handful of surviving "first generation" fixed trunnion bascule bridges are being demolished and replaced one after another. It appears that in the not too distant future, only a single example of the city's first fixed trunnion bascule bridge design will remain, that being



**Division Street Bridge over North Branch Chicago River Canal. Photo by Nathan Holth.**

the Cortland Street Bridge.

Particularly unfortunate is the 2014 project to demolish and replace the Division Street North Branch Canal Bridge. Built only a few years after the Cortland



**Clark Street Bridge elevation drawing.** Adapted from original engineering drawings provided by CDOT Division of Engineering.

Street Bridge, this double leaf bascule bridge is also an example of the earliest design of fixed trunnion bridge that the city developed, and one of only a few from this period surviving today. The bridge is also noted for its unique decorative overhead bracing which features cutouts that include Chicago's Municipal Device, which is a "Y" symbol representing the three branches of the Chicago River. This will not be the first loss in this area; the nearby bridge on Halsted Street was demolished in 2011. It was also a first generation bascule, and while it did not have the ornamental details of the Division Street Bridge, it was noted for its substantial 206 foot span length.

Also of concern is the plan to demolish and replace the Chicago Avenue Bridge over the North Branch Chicago River. The Chicago Avenue Bridge represents the second style of bascule bridge that Chicago designed and used in the city. In this design, the overhead bracing was eliminated forming a pony truss bascule design. The Chicago Avenue Bridge was among the first bridges in the city to have a more ornamental design of bridge tender house. The lower portions of the bridge tender houses were constructed of concrete, detailed to present the appearance of granite. The upper portions of the bridge tender houses were constructed with wood and covered with copper sheeting. The bridge was built only a handful of years after the adjacent Montgomery Ward Company Complex was completed, which is a National Historic Landmark and has been adaptively reused.

*Nathan Holth is the author of the website [HistoricBridges.org](http://HistoricBridges.org) and the book *Chicago's Bridges*. In researching and advocating for the preservation of historic bridges over the past decade, he has photographed thousands of historic bridges across North America.*

## North Clark Street Bridge 85th Anniversary July 10, 2014

*By Jim Phillips*

"GREAT PARADE TO OPEN SPAN, HAIL NEW ERA- Clark Bridge to be Ready July 10." That's the headline from the *Chicago Daily Tribune* on June 30, 1929. The parade consisted of ten groups depicting the development of Clark Street from Native American trail to modern city thoroughfare. Organized by the North Clark Street merchants, the parade was a celebration of the new bridge and a show of appreciation to the Chicago Public Works Department for completing the bridge six months ahead of schedule.

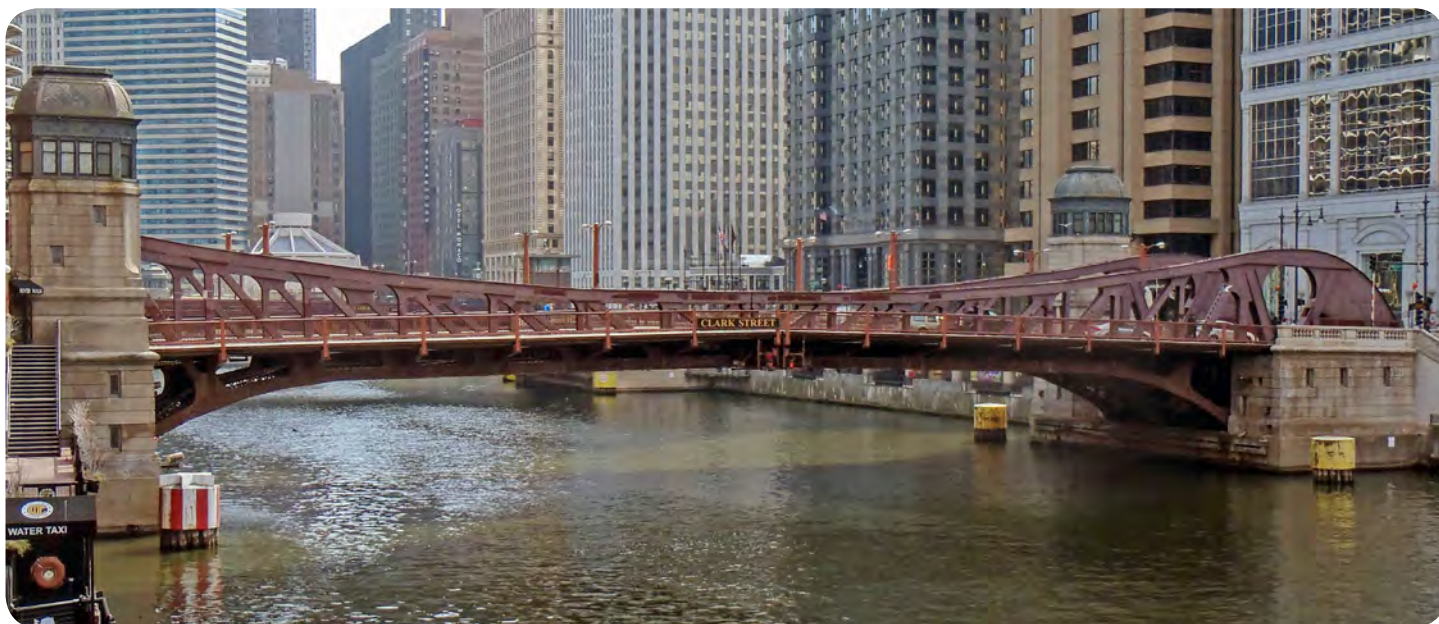
Movable bridges have been at this Chicago River crossing since 1840 when a floating pontoon bridge was built. The swing bridge era began in 1856 and continued until the current bascule was built. The removal of the Clark Street swing bridge marked the end of the swing bridge era on the Main Stem of the Chicago River.

The last Clark Street swing bridge was removed sooner than expected when the sand sucker (a boat used to remove sand from a river and deposit it on land for use as fill) *Sandmaster* knocked the bridge off its turntable on April 30, 1929. Enough damage was done to the old bridge that fixing it made little sense with the new bascule under construction and nearing completion. The decision was made to abandon



**Northwest bridgehouse at the North Clark Street Bridge.** Photo by Jim Phillips.





**The North Clark Street Bridge – looking east on the Chicago River. Photo by Jim Phillips.**

the old bridge and speed up the work on the new one. Remarkably, the first street cars crossed the new bridge only 48 days later on June 17.

With high tail-end curvaceous pony trusses and Beaux-Arts-styled bridgehouses, this Chicago-type trunnion bascule bridge has a striking and distinctive profile. The bridge plaque provides the organizations and individuals involved in the construction and design of the bridge.

Pony trusses were not well liked by members of the Chicago plan commission. In a 1930 Chicago Daily Tribune article Eugene Taylor managing director of the Chicago plan commission put it simply, “They look like the devil...”

As often the case, site constraints trumped aesthetic desires. Subsurface conditions dictated that trunnions be at shallower depths than those on bridges to the east. This meant more structural steel showing above the bridge deck here.

It could be argued today that this bridge provides visual relief from the sameness of the rail height trusses used on the bridges between here and Michigan Avenue. This was the last bridge built using pony trusses in the downtown area.

The *Sandmaster* had a mishap under the new bridge during its first trip down the river since ramming the swing bridge. It collided with a barge and the wreckage prevented the bascule from being lowered into place. The accident caused a two hour delay but did not damage the bridge. After this encounter, the *Sandmaster* was the record holding bridge-rammer: 45 collisions with thirteen Chicago bridges in three years.

A number of things have happened in the eighty-

five year life of the Clark Street Bridge. Probably the most unique event was the one-time gathering of the Clark Street Bridge Percussion Orchestra on October 6, 2007. For an afternoon the bridge became a drum for six professional drummers and hundreds of spectators turned participants in concert. The event was organized by conceptual artist Hugh Musik for Chicago Artists Month. Eric Roth composed the music. It provided a different way to enjoy and appreciate one of Chicago’s iconic bridges.

The Clark Street Bridge is now operated about 40 times each year for seasonal sail boat runs to and from Lake Michigan. It is always amazing to see the Loop bridges operate.

Currently the south bank of the river between State and La Salle streets is undergoing a transformation as the Chicago Riverwalk is extended west. After the dust clears next spring it will be possible to walk under the Clark Street Bridge. There are a lot of reasons to like the Riverwalk, but for a bridge enthusiast the ability to watch a bridge rise above you is a special treat.

(Note: Sources include: Chicago Daily Tribune 5/2/1929; 5/9/ 1929; 5/17/1929; 6/30/1929; 7/11/1929; 12/15/1929; 9/13/1930; 10/14/2007 (ProQuest Historical Newspapers Chicago Tribune (1849-2007); “Two Miles Eighteen Bridges – A walk along the Chicago River.”)

*Jim Phillips is a retired civil engineer whose interest and appreciation of Chicago’s downtown movable bridges led to the creation of [chicagoloopbridges.com](http://chicagoloopbridges.com). Jim lives in Chicago where he leads walking tours about the engineering, architectural, and cultural significance of these beauties.*

# Glimmer Glass Bridge

*By Fran and Jack Drew*

The Glimmer Glass Bridge was built around 1898 and the 34-foot drawbridge mechanism was installed in 1938. The unique rolling counterweight design, which originated in 19th Century France, features a drawbridge lifted by a pair of cables connected to a counterweight that runs along an elliptical track.

An electric motor mounted atop the upstream tower column brace turns sheaves which cause the counterweights to start moving down the track and lifts the span. The motor reverses the action to close the bridge. Because of its unique design, the rolling counterweights exactly balance the weight of the span in



**Simply brilliant. The rolling counterweight design dates back to French bridge engineering.** *Photo by Judi Benvenuti.*

on the c. 1950 deck girder movable span was installed in 1962. The significance of the structure is derived from the fact that it maintains its integrity of original design.

The Glimmer Glass Bridge was entered on the National Register of Historic Places on April 25, 2008. On February 28, 2008, the Glimmer Glass Bridge was placed on the New Jersey Register of Historic Places as a resource of “national significance,” per the New Jersey State Historic Preservation Office. The criteria for its listing are both the unique technology and the scale of the bridge in its special setting.

In 2005 a group of area residents sought to save the bridge from demolition and formed the “Save the Glimmer Glass Bridge Committee” to raise awareness and to raise funds to hire professionals to complete the necessary paperwork for nomination to the National Register of Historic Places. Coordinated by Eloise Knight, a Manasquan resident, thousands of dollars were raised and the group focused on placing the bridge on the National Register of Historic Places.

The Committee has also issued calendars, post cards and a jigsaw puzzle featuring the Bridge as part of



**The bridge continues to operate with the integrity and ingenuity of its 19th century technology.** *Photo by Judi Benvenuti.*



**The cable lift rolling counterweight system is based on the 19th century design by Frenchman Bernard Forest de Bélidor.** *Photo by Judi Benvenuti.*

all positions, thus minimizing the power of the motor. The operator’s house, like many elements of the bridge, has been upgraded over the years, but its function and profile are original.

The two-lane bridge, with single sidewalk, spans the Glimmer Glass, a navigable tidal inlet of the Manasquan River. The bridge is located in a salt marsh surrounded by a seasonal community of small cottages and some year-round houses. It is the only functional example of this late 19th Century bridge type in the United States today. The Glimmer Glass Bridge still operates in its original manner.

No original records or plans are available for the Glimmer Glass Bridge span, although plans for the bascule section date back to 1922. The bridge was rebuilt several times. The wood tower column and track were rehabilitated in 1957 and 1971 and the steel grid deck



## Case Study: Fairview-Snodgrass Road Bridge

- **Location:** Miami County, Ohio
- **Type:** 69 foot single span, pin-connected Pratt Pony Truss. Built 1913.
- **Purpose of Rehabilitation:** Relocation and reuse as a pedestrian bridge.
- **Year of Rehabilitation:** 2011
- **Details:** This bridge was being replaced with a new highway bridge. The preservation portion of the project relocated the historic bridge to Piqua, Ohio on a pedestrian trail. This relocation project preserved and reused a historic bridge in a new location, while also allowing the project to be completed with No Adverse Effect under Section 106, and avoided the need for Section 4(f). The bridge was cleaned and repainted as part of the project. This project was honored jointly by the Ohio Department of Transportation, the Federal Highway Administration, and the Ohio Historic Preservation Office as one of two recipients of a Historic Bridge Award in 2012.



Bridge before rehabilitation. *Photo by Nathan Holth.*



Bridge after relocation and rehabilitation.

*Photo by Nathan Holth.*



As local artist Linda Hejduk said “Keeping this drawbridge is our way to hold hands with history.” *Artwork by Linda Hejduk.*

the effort to education the public and secure their support. As local artist Linda Hejduk said “Keeping this drawbridge is our way to hold hands with history.”

The county engineers have proposed to replace the bridge with one of the same design but 50% wider and higher to meet Federal Highway standards for road width. This, of course, would remove the bridge from the historic registers and destroy the idyllic marshland habitat.

It is the position of the Committee that rehabilitation of the bridge should maintain the integrity of the bridge’s design and materials so as to retain its listing on the National and State Historic registers. To date, over 1,700 people have signed a petition in support of the Glimmer Glass Bridge. Many signers are Manasquan residents; however, people from all over the USA want

to see this bridge saved: New York, Pennsylvania, North Carolina, Connecticut, Florida, Arizona, Maine, Vermont, Utah, Georgia, Maryland, Texas, California, South Carolina, New Mexico, Virginia, Oregon, New Hampshire, Ohio.

*Fran and Jack Drew, a retired chemist and engineer, are ardent members of Save the Glimmer Glass Bridge Committee. Both are long-time supporters of historic preservation. They continue to encourage the county engineers to save the iconic Glimmer Glass Bridge.*

## The Prowse Memorial Bridge

**By James Garvin**

An award-winning bridge, hailed at its completion as the first welded steel rigid frame overpass on the interstate highway or primary road systems in the United States, is destined for removal during the widening of I-93 in Londonderry, New Hampshire. Completed in 1962 and designed by Robert J. Prowse of the New Hampshire Department of Public Works and Highways, the bridge was dedicated as a memorial to Prowse after his death in 1969 at age sixty-three. If the bridge cannot be relocated, it may be demolished.

The Prowse Memorial Bridge traces its origin to efforts by the James F. Lincoln Arc Welding Foundation of Cleveland to promote the fabrication of steel highway bridges through welding rather than traditional riveting. Beginning in 1938, the Lincoln Foundation announced a series of contests that challenged engineers to submit designs that would demonstrate the feasibility of welded fabrication of steel bridges of innovative design. Engineer Prowse won an honorable mention in a Lincoln Arc Welding Foundation contest of 1958 for his design of a welded continuous deck plate girder bridge.

In 1958, American Bridge, a division of United States Steel, announced a similar competition “dedicated to the stimulation of a more imaginative and effective use of steel in the design of highway overpasses typical of the



**Detail of the Prowse Memorial Bridge.** Photo by James Garvin.

thousands of such structures that must be designed and built along the 41,000 mile Interstate and Defense Highway by 1972.” The competition was opened to all professional and design engineers and college engineering students throughout the world. The problem to be solved was the design of a steel overpass structure to carry a two-lane highway over a four-lane interstate highway in accordance with then-current AASHTO standards.

Some 300 entrants submitted designs. Among the entries was a design by Prowse for a welded steel rigid frame overpass with freestanding vertical legs. Through cutting and welding, flared shoulders on each steel leg merged seamlessly with the horizontal spans in a series of gracefully curved spandrels, allowing the legs to resist bending stresses imparted by loading on the horizontal spans and to transmit those

stresses down to hinges at the bottoms of the legs. There, the stresses would be resolved into forces borne by heavy, buried footings.

The proposed design would span all four lanes of the interstate highway and the median without a central pier, “providing a structure less hazardous, having a more pleasing appearance, and without materially increasing the over-all cost.” Again, Robert J. Prowse was awarded an honorable mention and a prize of \$1,000.

Prowse’s award-winning design of 1959 might



**Elevation of Prowse Memorial Bridge.** Photo by James Garvin.



have remained an abstract concept if an extension of the interstate highway system were not being planned for central New Hampshire at that very time. The New Hampshire Department of Public Works and Highways saw an opportunity to transform Prowse's innovative design into an overpass that would meet an actual need of the interstate system in New Hampshire under the classification of an "Experimental Project." The bridge was completed at a cost of about \$183,000. In 1964, the American Institute of Steel Design (AISC) presented the bridge with an award for its outstanding aesthetic design.

In designing the bridge, Robert Prowse used both mathematical calculations and tests on a physical model.



**Bearings of the Prowse Memorial Bridge.** Photo by James Garvin.

As a rigid frame, the bridge is statically indeterminate and not subject to structural analysis by traditional formulas. After applying more complex computations to the design, Prowse concluded that "because of the unusual shape and size of the structure, it was felt that it would be desirable if some simple form of check could be made of the design calculations." To verify his calculations, Prowse used a device that had been developed in the 1920s by Professor George E. Beggs of Princeton University. Beggs discovered that microscopic deflections in a cardboard, celluloid, or Plexiglas model of a bridge component are proportionate to the internal stresses in the model. The method makes use of an instrument called a deformeter and a micrometer microscope to measure the tiny deflections of the model.

Recognizing the "exceptional significance" of the Prowse Memorial Bridge in 2006, authorities declared the span one of two resources on New Hampshire's interstate highway system that is subject to formal

"Section 106" and "4(f)" reviews if threatened. (Ordinary interstate components have been exempted from such review throughout the United States.) A memorandum of agreement, now in effect, requires that the New Hampshire Department of Transportation shall make a concerted effort to find an adaptive reuse for the bridge and move the bridge to a new location. If NHDOT does not identify a feasible re-use, the bridge will be marketed in accordance with widely-used but seldom effective standard procedures defined under the federal transportation act of 1987. If such a marketing effort fails to provide a new owner, location and use for the bridge, the structure will presumably be demolished.

A monograph detailing Robert J. Prowse's innovative engineering work can be found at: <http://www.nh.gov/nhdhr/publications/prowse.htm>.

*James L. Garvin was the State Architectural Historian at the New Hampshire Division of Historical Resources from 1978-2011. His specialties include history of American architecture, history of engineering, geographical history, building investigation, and traditional methods and materials of construction.*

## Zenas King and the Bridges of New York City Part I

**By Allan King Sloan**

By 1890, New York City had become the undisputed business and commercial capital of the USA and its most important international port. Its population had grown to over 1.5 million, mostly living on Manhattan Island which had grown steadily northward from the original settlement on the tip to what is now Harlem. Central Park had been developed as the City's main

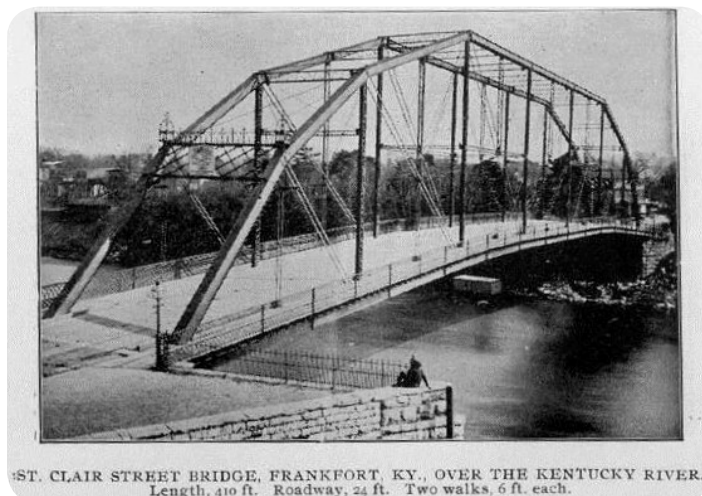


**Zenas King.**

amenity and its borders were attracting the opulent town houses of budding American capitalists. The five boroughs comprising the City as we know it today had not been consolidated into a unified municipal government – all were separate counties of New York State. The world famous Brooklyn Bridge had been completed in 1883, connecting Lower Manhattan to Brooklyn

which was also developing at a rapid rate. The decade of the Nineties was to witness the tremendous influx of immigration mainly from Europe that would increase the population to 3.45 million by the turn of the century. The needs for major transportation infrastructure, streets, highways, bridges, local transit, railroads and the like, were growing rapidly.

The King Bridge Company of Cleveland founded by Zenas King in 1858 had become one of the most important builders of iron and steel bridges in the country, with a solid reputation and respect from its multitude of competitors. The factory in Cleveland was able to produce components for a variety of fixed and movable bridges, and had successfully completed large cantilever bridges in Cincinnati, Pennsylvania and Oregon, and even a suspension bridge in St. Louis, along with a number of highway and railroad trestles and through trusses spanning major rivers. Zenas King was in his early seventies and had



**St. Clair Street (Bridge Street) Bridge over Kentucky River, Frankfort, Kentucky. This bridge was built in 1893 by the King Bridge Company and remains standing today.**

structured a family-owned and operated company, into which his sons were put into management positions at an early age. While Zenas and his sons did not receive any formal training as civil engineers, the company hired a succession of outstanding engineers including Frank Osborn and Albert Porter, among others, who went on to create their own companies later in their careers. Zenas was a self-made man of ambition, energy and foresight and must have been well aware of his Cleveland neighbors (like J.D. Rockefeller) establishing themselves in New York to continue their company's growth. He must have seen the opportunity New York City afforded for his business, so he proceeded to develop an audacious plan for his entry into this booming market for bridges. The King Bridge Company had established an office at 18 Broadway in

Lower Manhattan in 1889 under the management of Henry G. Gladstone.

On February 6, 1892, the first page of the *New York Times* carried the following headline:

**MORE BIG BRIDGE SCHEMES  
THE OBJECT IS TO CONNECT HARLEM WITH LONG ISLAND CITY.  
THE ENTERPRISE IS BACKED BY THE KING BRIDGE COMPANY OF  
CLEVELAND WITH PLENTY OF MONEY**

The article then went on to describe the provisions of the bill which was introduced to the State Senate in Albany by Senator Floyd-Jones which sought to incorporate the Manhattan and Long Island Bridge Company. The incorporators listed in the bill included Zenas King, President of the King Bridge Company, along with his sons James A. and H.W. King, Company Secretary Harley Gibbs, and Henry Gladstone, Manager of the New York office. The others included:

- Daniel P. Eells, the Cleveland banker and part owner of the Nickel Plate Railroad, who had been on the Board of Directors of the King Bridge Company from the beginning.
- Daniel Magone of Ogdensburg (near Zenas's childhood home), ex-Collector of the Port of New York
- John E. Van Ostrand
- J.J. Moreland, an iron manufacturer of Chatham, New York
- Charles A. Otis, President of the Otis Steel Company of Cleveland
- Charles F. Stowell, consulting engineer, of the Railroad Commissioner's Office
- John J. Donovan, a New York contractor

The first bridge listed in the bill was to cross the East River from Long Island City near Flushing Avenue to Mid-town Manhattan somewhere between 41st and 59th Streets, traversing the lower end of what is now Roosevelt Island (then Blackwell Island). This is basically the location of the Queensboro (Koch) Bridge built some 16 years later. The second bridge, or more accurately series of bridges and causeways, was to connect what is now Astoria in Queens to East Harlem in Manhattan and Morrisania in the Bronx across the East and Harlem Rivers, traversing Wards and Randalls Islands. This is basically the function of the Triborough (Robert F. Kennedy) Bridge built in the 1930s.

The Times article described Zenas King as "a well-known capitalist of Cleveland" who had "this scheme under consideration for a long time and is said to be well able to carry it through without drawing on anybody's bank account besides his own." The money described in



the Times article was \$1 million in capital stock owned by the bridge company which could be expanded to \$15 million through action by the stockholders. It was to be a money-making operation with revenues provided by tolls from “wagons and pedestrians” and eventually the railroads that were expected to use the facilities. The bill also provided for land acquisition by the company and an exemption from taxation for five years.

At this period of the country’s history, private entrepreneurs, including bridge builders, were often providers of major transportation infrastructure including turnpikes, river crossings (ferries) and railroads where fees and tolls were charged for traffic usage. This was to change in later decades as state and local governments took over responsibility for transportation facilities and created public authorities which now control much of the major transportation infrastructure, particularly in the New York region. But when Zenas King developed this grand plan, private companies were still in the business – the “dot-com” entrepreneurs of the late 19th century.

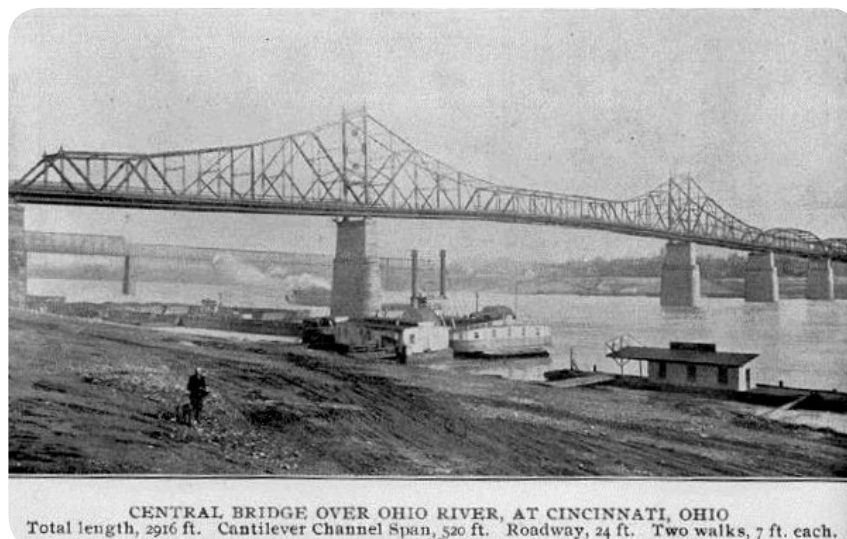
The King Bridge Company had had at least two major bridge engineering successes in the years just prior to the “Grand Scheme” which must have engendered confidence that this ambitious plan could be pulled off. The first was the Central Bridge across the Ohio River connecting Cincinnati with Newport Kentucky. It had a total length of over a half a mile and featured a center cantilever span of 520 feet, which was the second longest cantilever span in North America at the time of its completion. Albert Porter was a major participant in the design of the approaches and Frank Osborn, the company’s chief Engineer, designed the cantilever section. This project was so important to the company that a sketch of it was incorporated into the King Bridge Company’s masthead. It was featured in engineering journals of the day, including a lengthy article in the “Transactions of the American Society of Civil Engineers” in 1892.

The second was the Central Viaduct in Cleveland, a series of structures totaling over 3,900 feet crossing the broad valley of the Cuyahoga River connecting the east and west sides of the city. The construction of the

bridge required innovative methods and techniques. It consisted of a series of iron deck trusses of varying lengths supported on iron towers of varying heights, with a central movable span over the river that had to be constructed without interfering with river traffic. The central span was constructed by building cantilever sections out from the top of a masonry pier without the use of falsework. The engineering journals of the time featured a number of articles about the construction methods used and the King Bridge Company catalogues of the 1890s devoted four pages to the structure. The completion of the Central Viaduct was a cause for civic celebration. It was opened with great fanfare in December of 1888 and featured a parade of soldiers and civilians marching to the center of the structure to hear speeches by various dignitaries, including Zenas King. This was followed by a grand banquet at the Hollenden Hotel, with messages of congratulations from John D. Rockefeller, a former Euclid Avenue neighbor of Zenas King, and President Grover Cleveland.

With this background and recognition, Zenas and his engineers were probably quite confident that they could design and build the proposed bridges to connect Manhattan and Long Island across the East River and associated waterways. A bridge similar to the Cincinnati cantilever (which was just upstream of the Roebling Suspension Bridge which predated the Brooklyn Bridge) may be what Zenas had in mind for this first bridge. Multiple structures like the Central Viaduct might have been the model in mind for the second bridge across the East and Harlem Rivers traversing many islands.

But this ambitious and far-sighted plan was not to be. Zenas King died on October 25, 1892 and with him this grand scheme. His sons who took over the business, both well established in the social and business life of Cleveland, did not seem inclined to pursue this major business venture in New York. However, the King Bridge Company did continue to do important business in the City and built some notable highway and railroad facilities in the



CENTRAL BRIDGE OVER OHIO RIVER, AT CINCINNATI, OHIO  
Total length, 2916 ft. Cantilever Channel Span, 520 ft. Roadway, 24 ft. Two walks, 7 ft. each.  
— 18 —

**The Central Bridge. This bridge was demolished and replaced in 1992.**

1890s and beyond.

What inspired Zenas King not only to develop this grand scheme but to carry it forward enough so that it had

reached the New York State Legislature? Was it the desire to move his company to the top tier of the bridge building industry? Was it a vision of what New York needed in the way of infrastructure? Was it to keep up with the other bridge builders who had developed other grand schemes for New York? Was it a desire to match the Roeblings and other large and famous bridge builders in notoriety? Was he interested in just making a lot more money? We will never know the answers to these questions, but seeing the energy and ambition that marked his career path, it was probable a combination of all these factors.

However, the King Bridge Company, under the leadership first of James A. King, and later his brother Harry W. King, had a number of other pressing issues to deal with after Zenas's death. One of the most important issues was mapping a response to the efforts of financier J.P. Morgan and steel baron Andrew Carnegie to consolidate the bridge building industry by purchasing the plethora of

independent companies under the banner of the American Bridge Company. By 1900 American Bridge had succeeded in acquiring 29 of the nation's major bridge builders including many of the major competitors of the King Bridge Company. While apparently approached to join, the Kings famously decided to remain independent. In addition, there was the looming problem of dealing with the anti-trust sentiment growing in the country which targeted the "bridge trust" created by Zenas King and other mostly Ohio based builders for legal actions including price fixing and market manipulation. A law suit brought by the State of Ohio against King and eight other bridge companies (some of whom had been acquired by American Bridge) resulted in the King Bridge Company's losing its Ohio franchise in 1906. To continue in business, it had to be reincorporated in New Jersey.

It would be some years in the future that the great bridges envisioned by Zenas King and friends would actually be built. The Greater City of New York was created in 1897 by combining the five adjacent counties into the five boroughs we know today, making the largest municipal government in the nation. This enabled the creation of a powerful central authority able to plan and carry out major

infrastructure programs, including highways, bridges, public transit facilities and others. A Department of Bridges was created in the early 1900s under the leadership of Gustav Lindenthal, a Czech born civil engineer who had once worked for the Keystone Bridge Company, a rival of the King Bridge Company, and was a consultant for bridges built in Pittsburgh and elsewhere, and he had created his own bridge company (the North River Bridge Company). Under his direction, plans were made for the building of the Queensboro Bridge which was completed in 1909, some 17 years after Zenas had launched his grand scheme. It now carries the highest volume of daily traffic of any of the City's bridges.

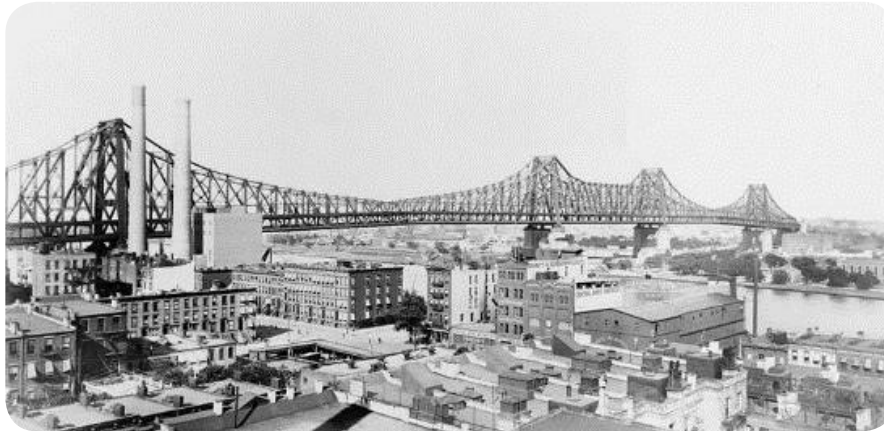
It was not until 1916 that City engineers began to seriously consider what is now the Triborough (Robert F. Kennedy) Bridge. Its serious planning and design was not undertaken until 1925 and construction started in 1929 with revised designs produced by well-known bridge

designer, Othmar Ammann. With the great depression underway, the bridge was not completed until it was funded under New Deal grants, directed by construction maven, Robert Moses, and opened for traffic in 1936, some 42 years after the death of Zenas King.

Notes: Serious proposals for a bridge linking Manhattan to Long

Island City were first made as early as 1838 and attempts to finance such a bridge were made by a private company beginning in 1867. Its efforts never came to fruition and the company went bankrupt in the 1890s. Successful plans finally came about in 1903 under the city's new Department of Bridges, led by Gustav Lindenthal (who was appointed to the new position of Commissioner of Bridges in 1902), in collaboration with Leffert L. Buck and Henry Hornbostel. Plans for connecting Manhattan, Queens and the Bronx were first announced by Edward A. Byrne, chief engineer of the New York City Department of Plant and Structures, in 1916. While its construction had long been recommended by local officials, the Triborough Bridge did not receive any funding until 1925, when the city appropriated funds for surveys, test borings and structural plans. (Source: Wikipedia)

*Allan King Sloan is the great grandson of Zenas King, founder of the King Bridge Company of Cleveland, Ohio. The Allan King Sloan Family Fund is a donor-directed charitable gift fund set up by the descendants of the Zenas King. It was established in 2000 to provide funds to various nonprofit organizations involved in documenting and preserving historic bridges.*



**The Queensboro Bridge, also known as the 59th Street Bridge and officially named the Ed Koch Queensboro Bridge.**





The King Bridge Company's Central Bridge in its later years. *Photo by Dave Michaels.*

## Upcoming Conferences

### A Monumental Task: Managing & Preserving Architectural Records

Location: Buffalo NY

Date: July 17, 2014

Summary: Speakers at this conference will address the many aspects of caring for architectural record collections. Participants will learn about the significance of architectural records; the array of materials and methods used to create them; collecting policies; access and use recommendations; preventive preservation measures; reformatting and management of electronic files.

Website:

<http://www.cvent.com/events/a-monumental-task-managing-and-preserving-architectural-records/event-summary-76a97c2ea66d48eea1eb56859117d20a.aspx>

### Advanced Section 106 Seminar

Location: Washington DC

Date: July 22, 2014

Summary: The seminar focuses on the effective management of complex or controversial undertakings that require compliance with Section 106 of the National

Historic Preservation Act.

Website:

<http://www.preservationdirectory.com/PreservationNewsEvents/NewsEventsDetail.aspx?id=3803>

### Section 106 Essentials Training

Location: Albuquerque NM

Date: August 19-20, 2014

Summary: This two-day course is designed for those who are new to federal historic preservation compliance or those who want a refresher on the Section 106 regulations.

Website:

<http://www.preservationdirectory.com/PreservationNewsEvents/NewsEventsDetail.aspx?id=3796>

### Advanced Section 106 Seminar

Location: Albuquerque NM

Date: August 21, 2014

Summary: The seminar focuses on the effective management of complex or controversial undertakings that require compliance with Section 106 of the National Historic Preservation Act.

Website:

<http://www.preservationdirectory.com/PreservationNewsEvents/NewsEventsDetail.aspx?id=3804>

## **Section 106 Essentials Training**

Location: Washington DC

Date: September 9-10, 2014

Summary: This two-day course is designed for those who are new to federal historic preservation compliance or those who want a refresher on the Section 106 regulations.

Website:

<http://www.preservationdirectory.com/PreservationNewsEvents/NewsEventsDetail.aspx?id=3797>

## **Section 106 Essentials Training**

Location: Oakland CA

Date: September 16-17, 2014

Summary: This two-day course is designed for those who are new to federal historic preservation compliance or those who want a refresher on the Section 106 regulations.

Website:

<http://www.preservationdirectory.com/PreservationNewsEvents/NewsEventsDetail.aspx?id=3798>

## **2014 Statewide Historic Preservation Conference**

Location: Huntington WV

Date: September 25-27, 2014

Summary: Preserve West Virginia will be hosting its 2014 Statewide Historic Preservation Conference in Huntington, WV. This year's conference theme is "From the Ground Up: Archaeology, Brownfield Re-use, & Historic Preservation".

Website:

<http://preservationalliancewv.wordpress.com/events/>

## **2014 Conference on Illinois History**

Location: Springfield IL

Date: September 25-26, 2014

Summary: The conference includes 20 paper sessions that feature topics such as politics, Abraham Lincoln, Route 66, archaeology, and the Civil War; one film; eight workshops; and three panel discussions.

Website:

<http://www.illinois.gov/ihpa/Involved/Pages/Conference.aspx>

## **Preserving the Historic Road 2014**

Location: Savannah GA

Date: September 26-28, 2014

Summary: The 2014 Preserving the Historic Road Conference, partnered with the National Scenic Byways Foundation, will provide a diverse and comprehensive conference program, which will include enlightening educational sessions, and informative mobile workshops to unique sites (featuring some great shrimp, grits and barbeque). The combination of these events will let you experience southern road culture, history and local issues that tie in to the national, and global, perspective of historic road identification and protection.

Website:

<http://www.historicroads.org/>



**Ironton-Russell Bridge over the Ohio River. A project to replace and then demolish this historic cantilever truss bridge is underway. The 1922 bridge is one of the oldest highway bridges on the Ohio River. Photo by Nathan Holth.**



## Festival of Riverboats

Location: Louisville KY

Date: October 18, 2014

Summary: Celebrate America's rich Southern heritage with a cruise on the mighty Ohio River during Louisville's Centennial Festival of Riverboats. In October 2014, nine historic riverboats will provide the backdrop as Louisville plays host to a six-day festival of food, bourbon, music and art at the internationally-acclaimed Waterfront Park. Louisville is also noted for its historic bridges which cross the Ohio River.

Website:

<http://festivalofriverboats.com/>

## Society for Industrial Archaeology Fall Tour 2014

Location: Southern Indiana

Date: October 5-8, 2014

Summary: The base for this year's tour will be the Clifty Inn located in Clifty Falls State Park about five miles west of Madison. The Fall Tour's Sunday afternoon opening schedule includes a tour of downtown Madison, with its 130-block National Historic Landmark District which is one of the best preserved and the largest of its kind in the U.S. The tour also offers opportunities to visit sites in Columbus and Seymour, for Cummins Diesel and Seymour Manufacturing, the latter a firm that has been making lawn and garden tools since the 1870s. Columbus features world-recognized architecture. Plans are also underway for a full-day up river tour which may explore more of



**The Triple Whipple Bridge over Laughery Creek, Indiana. This is the only triple intersection Pratt truss bridge known to survive today. Photo by Nathan Holth.**

southeastern Indiana including a triple-intersection Pratt truss bridge over Laughery Creek and other historic and active industrial sites along the river.

Website:

<http://www.sia-web.org/fall-tour-2014-south-east-indiana/>

## Past Forward: The National Trust for Historic Preservation Annual Conference

Location: Savannah Georgia

Date: November 10-14, 2014

Summary: The premier educational and networking event for those who are committed to saving places. PastForward features in-depth Learning Labs, on the ground exploration through Field Studies, Intensive Workshops and live demonstrations, films and exhibits in the Preservation Studio. PastForward, engages new audiences in Savannah and virtually with TrustLive, live-streaming marquee presentations that explore preservation through new lenses including climate change, real estate, data mapping, and new audiences.

Website:

<http://www.preservationnation.org/resources/training/npc/>



**The Big Four Bridge in Louisville, KY is a historic former railroad bridge that has been reused as an iconic pedestrian bridge. Photo by Mike Miley, CC BY-SA 2.0, flickr.com/photos/mike\_miley/**

**Historic Bridge  
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