CHICAGO RIVER BASCULE BRIDGE,
MONROE STREET
I&M Canal National Heritage Corridor
Chicago
Cook County
Illinois

HAER No. IL-53

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
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HISTORIC AMERICAN ENGINEERING RECORD

CHICAGO RIVER BASCULE BRIDGE, MONROE STREET
I&M Canal National Heritage Corridor

HAER No. IL-53

Location:	I & M Canal National Heritage Corridor West Monroe Street crossing the Chicago River (South Branch) Chicago, Cook County, Illinois UTM: 16 E.447040 N.4636500 Quad: Chicago Loop
Date of Construction:	1919
Builder:	Substructure, Fitzsimons & Connell Dredge and Dock Company Superstructure, Ketler and Elliot Company
Present Owner:	City of Chicago
Present Use:	Bridge
Significance:	The development of the Chicago trunnion bascule bridge occurred during the first three decades of the twentieth century. Despite the controversy over patent infringement -- Joseph E. Strauss charged the City of Chicago engineers with infringing on his patented Strauss-Trunion bascule bridge -- the Chicago bascule received great acclaim within the civil engineering profession. The Monroe Street bridge is typical of this design.
Project Information:	The Illinois and Michigan Canal was designated a National Heritage Corridor in 1984. The following year HABS/HAER embarked on an extensive inventory and documentation project of the 100 mile-long corridor. Field work for this project was concluded in 1988. Final editing of the documentation was completed in 1992.
Historians:	Charles Scott, Frances Alexander, and John Nicolay, 1986.

In 1899, the Chicago Bridge Division organized a Board of Consulting Engineers to determine a suitable design for the Chicago River. The trunnion bascule bridge was chosen and developed into a practical and efficient design to accommodate the heavy demands of land and water traffic in Chicago. A trunnion bascule bridge was built to carry Monroe Street over the Chicago River in 1919. The substructure was constructed by Fitzsimons & Connell Dredge and Dock Company, and the superstructure was erected by the Ketler and Elliot Company of Chicago. The Monroe Street Bridge is virtually identical to the Franklin Street Bridge.

The Monroe Street Bridge is a single-deck, double-leaf, trunnion bascule bridge. The bridge measures 192'-9" from center to center of the trunnions and has a clear span of 165'-6". Superstructure is a steel pony truss with riveted gusset-plate connections. Width measures 60'-0". The abutments are reinforced concrete with a rusticated concrete veneer. A stylized sunburst motif is used on the interstices of the pedestrian guard rail. The two granite-faced bridge tenders' houses (one on each side of the bridge) contain an octagonal plan, with a row of one-over-one-light, double-hung, sash windows and a denticulated cornice. There is a hipped roof of simulated tile (the material is tin) and the crown has a shell motif. At the base is a service door filled in with concrete. The original glass-block light over door is extant.

SOURCES:

"Chicago Bascule Bridge- Design and Operating Features," Engineering News Record, v. 85 (September 9, 1920): 508-514.

"Chicago Settles with Strauss for Infringing Bridge Patent," Engineering News-Record, v. 85 (December 9, 1920), 1158-59.

Donald N. Becker, "Development of the Chicago Type Bascule Bridge," Transactions of the American Society of Civil Engineering. v. 109 (1944): 995-1046.

Donald N Becker, "The Story of Chicago's Bridges," Midwest Engineer, 2 (January 1950): 3-9.

Chicago Department of Public Works, Chicago Public Works: A History (Chicago: Rand McNally, 1973).

"The Chicago Type of Bascule Bridge," Engineering Record, v. 42 (July 21, 1900): 50-52.

"The Lift or Bascule Type of Movable Bridges," Engineering Record, v.42 (July 28, 1900): 73.

HISTORIC AMERICAN ENGINEERING RECORD

CHICAGO RIVER BASCULE BRIDGE, MONROE STREET

This report is an addendum to a 2 page report previously transmitted to the Library of Congress in 1995.

Location:	Spanning the South Branch of the Chicago River at Monroe Street, Chicago, Cook County, Illinois. UTM: 16/447040/4636500 Quad: Chicago Loop
Date of Construction:	1919
Designer:	City of Chicago
Builder:	Fitzsimmons& Connell Dredge & Dock Co. (substructure); Ketler & Elliot Company (superstructure)
Present Owner:	City of Chicago.
Present Use:	Vehicular bridge.
Significance:	The Monroe Street Bridge is representative of the simple trunnion bascule bridge that became widely known as the "Chicago Type." Although bridges of the "Chicago type shared basic principles, the design had undergone significant development since the original "Chicago-type" bridge opened at Cortland Street in 1902. By 1913 when initial studies for a new bridge at Monroe began, engineers of the city's Bridge Division had roughly standardized a "second generation" of the "Chicago-type."

Historian: Matthew T. Sneddon, June 1999.

Project Description: The Chicago Bridges Recording Project was sponsored during the summer of 1999 by Historic American Buildings Survey and Historic American Engineering Record HABS/HAER under the general direction of E. Blaine Cliver, Chief; the City of Chicago, Richard M. Daley, Mayor; the Chicago Department of Transportation, Thomas R. Walker, Commissioner, and S. L. Kaderbek, Chief Engineer, Bureau of Bridges and Transit. The field work, measured drawings, historical reports, and photographs were prepared under the direction of Eric N. DeLony, Chief of HAER.

Significance

The Monroe Street Bridge is representative of the simple trunnion bascule bridge that became widely known as the "Chicago type." Although bridges of the Chicago type shared basic principles, the design had undergone significant development since the original Chicago type bridge opened at Cortland Street in 1902. By 1913 when the initial studies for a new bridge at Monroe Street began, engineers of the city's Bridge Division had roughly standardized a "second generation" of the Chicago type. Despite a patent infringement lawsuit filed against the structural system used in this standardized design, it remained a model for the Monroe Street Bridge and several other bridges built during World War I. Standardization was also extended to the architectural treatment of the bridge, which reflected the growing influence of the civic advocates of improving the physical beauty of bridges on the Chicago River. The bridge's architecture, designed by architects from the private sector, was typical of other bridges built between 1916 and 1922. When compared with other Chicago types, however, the Monroe Street Bridge is, in certain respects, a unique structure. Because engineers devised a custom design to accommodate the space restraints imposed by the construction of nearby Union Station, the bridge provides one of the best examples of how the city engineers shaped the general Chicago-type design to fit the specific conditions of each site. In its aesthetic form and structural design, the Monroe Street Bridge illustrates many of the physical and intangible factors that influenced the engineering of movable bridges in Chicago.

Bridge History

In his "New Year's Address to the People of Chicago" in 1913, Mayor Carter Harrison called attention to the "entirely inadequate" facilities for crossing the Chicago River, and assured his constituents that new bridges were being built with "all dispatch possible."[1] Most of the movable bridges on the river in 1913 were center-pier swing types. Although these bridges generally opened quickly, the center-pier that served as the pivot point for the span posed an obstacle to the increasingly larger boats that attempted to navigate the Chicago River. Pressure to replace the swing bridges was mounting from several different sources, and the city's Bridge Division was hard pressed to keep pace with the demand for the bascule types that left a clear channel for navigation when open. Although funds from a 1911 bond issue had finally enabled the city to proceed with an ambitious program of new construction, the scale of the problem greatly exceeded the Division's resources. On the south branch of the Chicago River, a bascule at Washington Street had recently been completed, but four swing bridges at Lake, Madison, Adams and Jackson drew the ire of river traffic interests as particularly egregious obstacles to

[1] Francis A. Eastman, *Chicago City Manual* (Chicago: Bureau of Statistics and Municipal Library, 1913), 159.

navigation. Local commercial organizations such as the influential Chicago Association of Commerce and Chicago City Club, recognizing the vital role of the bridges in the city's economic growth, added their weight to the campaign for new bascules. On several occasions, the Association of Commerce urged the Sanitary District, which also had an interest in removing obstacles to the flow of the Chicago River, to join in the city's efforts to replace the swing bridges with the new Chicago-type bascule. Even with the Sanitary District's pledge to build a bascule bridge at Jackson Boulevard, the city sought additional sources of bridge funding wherever possible.

Instead of priority being placed on the immediate replacement of the existing swing bridges on the south branch, however, city engineers were directed to study Monroe Street as the location for a new bridge. The directive was in part a practical consideration: traffic could be diverted over the new bridge at Monroe when bascules at nearby Jackson Boulevard, Madison Street, and Adams Street were eventually built. Another motivating factor was the need to improve the flow of traffic to the downtown district. In discussions concerning the congestion plaguing the Loop, city council members agreed that "owing to the crowded conditions of the loop district of the city, the facilities for caring adequately for traffic from the downtown district to the West Side are daily growing worse and it is imperative that some means immediately be devised to facilitate the movement of traffic."[2] In considering a new bridge for Monroe Street, the council was also responding to pressure from the area's business and property owners. Some of the foremost proponents of the new bridges were local associations formed by business men that stood to benefit from their construction -- the Monroe Street bridge proposal was no exception.[3] Lastly, a bridge at Monroe street was an important component of a larger plan to transform the transportation infrastructure of the Loop. Urban planners in Chicago envisioned Monroe Street as a major artery directly connecting west side surface traffic to Grant Park and the limited access highway planned at Lake Shore Drive.

The task of improving the connections between the east and west banks of the south branch was complicated by potential plans to build a Union Station on the west side near Adams Street and Jackson Boulevard, a location that was a subject of some debate. Much of Chicago's

[2] City of Chicago, *Proceedings of the City Council* (12 January 1914), 3392.

[3] Local Aldermen John Toman and Winfield Held, responding to agitation "by the businessmen of the locality in and around Monroe Street, to construct a bridge at this point," introduced a measure to make a feasibility study of a bridge at Monroe Street. City of Chicago, *Proceedings of the City Council* (2 June 1913), 799. Other petitions for the bridge were heard from the Chicago Cartage Club. City of Chicago, *Proceedings of the City Council* (30 March 1914), 4659.

urban planning had been largely guided by Daniel Burnham's 1909 Chicago Plan. Although the plan itself called for an vast, integrated Union and North Western Station between Clinton and Jefferson streets, bounded by 12th Street in the south and Fulton Street in the north, by 1913, the city-appointed Chicago Plan Commission (CPC) charged with carrying out this plan advocated a more modest southerly site at 12th Street near the river.[4] According to historian Paul Barrett, the CPC met formidable opposition from the Pennsylvania Railroad who favored a Union Station at Jackson Boulevard on the west bank of the south branch. The Pennsylvania Railroad and Chicago Loop businesses feared a decline in sales would result from the more southerly station. Together, they defeated the 12th Street Union Station proposal, but the city did not relent without exacting certain concessions.[5] As part of the agreement, the city required the Union Station Company (a consortium of railroad companies formed to build a Union Station) to fund construction of the Monroe Street Bridge. As a result, the Monroe Street Bridge was the only bascule on the Chicago River designed, operated and maintained by the city that was built with private funds.

Although its connection to the Union Station construction provided some much needed financial support, the bridge's physical proximity to the station presented some engineering problems. As Engineer of Bridge Design, Hugh E. Young led the team of engineers that studied the site. The thirty-year old engineer, whose later work with the Chicago Plan Commission made him a important figure in Chicago's engineering community, had recently worked for the Chicago, Milwaukee & St. Paul Railroad Company and the Monroe project was likely his first collaboration with established Bridge Division engineers Alexander von Babo and Thomas G. Pihlfeldt. Young's first hurdle was a set of railroad tracks that ran along the west bank of the river at Monroe Street occupied the space normally required for a counterweight pit. In addition, Monroe Street lay above several subterranean obstacles, including an abandoned "cross town" water tunnel that diagonally crossed the river at this point, and two Chicago Tunnel Company freight tunnels under the street at the eastern bank. As a result, Young's engineers devised two separate designs for the east and west leaves of the bridge. To avoid interfering with the railroad tracks and construction related to Union Station, they made the counterweight arm of the west leaf unusually short, with a cast iron counterweight instead of the concrete one typically used in counterweight pits of larger dimensions.[6] Consequently, from counterweight to pitch radius, the west leaf was a custom design. Because the shorter counterweight arm required a heavier

[4] Carl W. Condit, *Chicago, 1910-29: Building, Planning and Urban Technology* (Chicago: University of Chicago Press, 1973), 71.

[5] Paul Barrett, *The Automobile and Urban Transit: The Formation of Public Policy in Chicago, 1900-1930* (Philadelphia: Temple University Press, 1983), 79.

[6] Chicago Department of Public Works, *Annual Report of the Chicago Department of Public Works* (1914), 148.

counterweight, the west leaf imposed a higher loading on the west trunnion bearing, and the truss had to withstand correspondingly higher stresses and bending moments. Instead of an enclosed concrete counterweight pit that allowed larger concrete counterweights to swing below the riverline, engineers eliminated the enclosed pit on the western bank -- with its shorter radius of rotation, the cast iron counterweight merely ended its travel when opening about a foot above the river. Deep subpiers of reinforced concrete that reached hard rock at 117 feet below city datum supported the counterweight pits on both sides, but the arrangement and number of the shafts differed in the west and east foundations. The original plans included a gatehouse that would be built over the street at the west end of the bridge to control the operation of both leaves, leaving the eastern house to serve merely as a point to monitor traffic. Although evidence does not explicitly explain why this arrangement never proceeded past the initial design stage, it is likely the architects of the CPC and AIA objected to its lack of symmetry and its deviation from the model provided by the Jackson Boulevard Bridge. The architects wanted continuity on the Chicago River, and in several cases, forced the Bridge Division to drop plans that disrupted the harmonious vision of congruent double leaf bascules spanning the river.[7] Ultimately, a more conventional system of two operators' houses was used, albeit with a smaller house on the east bank pressed against the corner of the Fisher Building that closely abutted the bridge at this time.[8]

Aside from the uncharacteristic lack of symmetry between the western and eastern sections of the bridge, its operating machinery and structural design borrowed from a design developed for earlier bridges at 92nd, Washington Street, and Grand Avenue. The gearing for each leaf consisted of a patented rack and pinion system mounted internally within the rear end of the truss, driven by two separate drive train and direct current motor units. To accommodate operating machinery maintenance or failures, either sixty horse power motor unit was capable of raising the leaf individually. Operation of the bridge was controlled from two operator's houses, one on each bank of the river. According to Bridge Engineer C. H. Norwood, the Monroe

[7] Protests effectively ended consideration of vertical lift bridges at Lake Street and 12th Street, forced engineers to drop plans for a single leaf bascule at Monroe Street, and rejected a proposed architectural rendering of the Franklin-Orleans Bridge in favor of another more harmonious with nearby bridges.

[8] The Fisher Building that abutted the east operator's house was razed in 1937, and a concrete wall was added to the section of eastern operator's house exposed by this demolition. Chicago Department of Public Works, *Annual Report of the Chicago Department of Public Works* (1937), 235.

operator's houses were the first in the United States equipped with "safety first" control devices.[9] These control boards had totally enclosed circuitry to avoid the dangers of the exposed copper connections of earlier models. From a vantage point in the upper level of the operator's house, the bridge tender controlled the electric motors, center-lock mechanism, and mechanical and pneumatic brakes that slowed the speed of the movable leaf as it reached the fully open or fully closed position.

As it raised or lowered, the movable leaf rotated on two fixed axles or trunnion bearings. Supporting the trunnion bearings was a special concern because the entire weight of the leaf concentrated on two bearings as it opened, but the supports had to allow space for the path of the large counterweight rigidly fixed to the rear end of the truss. Trunnion bearing supports in the Monroe bridge followed the basic structural system developed by von Babo and Pihlfeldt in several bridges built between 1908 and 1913. This system relied on several large girders to carry the loads to the concrete counterweight pit. Along each side of the counterweight pit, a longitudinal girder extended from the front wall to the back wall. Across these two longitudinal girders ran a transverse or "cross" girder that supported the trunnion bearings.

The cross girder system became a point of contention in a patent infringement suit brought by Chicago bridge engineer Joseph Strauss against the City of Chicago in 1913. Strauss included the Monroe Street Bridge among several others in the lawsuit, claiming its cross girder infringed on an earlier Strauss patent. Attorneys for Strauss endeavored to establish that the cross girder, together with an unusually configured main truss, allowed the use of a much larger and cheaper counterweight made of concrete rather than cast iron. This argument was critical to Strauss' assertion that the city had benefited from the design. Ironically, because the custom design of the Monroe Street Bridge used two different types of counterweights, an expert witness for the plaintiff cited it as evidence of how much the city saved with the cross girder system. By his estimate, the concrete counterweight in the east leaf cost some $33,000 less than the cast iron counterweight in the west leaf.[10] Although the lawsuit began well before the Monroe Street Bridge plans were finalized, the city's bridge engineers did not eliminate the cross girder design. In fact, quite the opposite course was taken: the engineers continued to use the cross girder in several bridges built during the lengthy period of litigation. This suggests that the city may have

[9] "The Wells Street Bridge" *Journal of the Western Society of Engineers* 27, no. 2 (February 1922): 64.

[10] The expert witness was Olin H. Basquin, Professor of Applied Mechanics at Northwestern University, and engineering consultant to several private companies. By his calculation, the concrete counterweigbt in the east leaf cost $7,095 versus $40,510 for the cast iron counterweight in the west leaf. *City of Chicago v Strauss Bascule Bridge Co.*, 2677 US Circuit Court of Appeals, 7th Circuit, 163 (1918). Thanks to Jeff Hess for uncovering and sharing materials related to the bridge lawsuits.

been confident of winning the lawsuit, a confidence dashed by the court's adverse ruling against the city in 1920. After the payment of nearly $350,000 to the Strauss Bascule Bridge Company (later the Strauss Engineering Corporation), the city engineers became wary of potential patent conflicts and experimented with other types of trunnion supports during the 1920s.[11] Patents, as the Strauss case revealed, were an influential factor in bridge design and the development of the Chicago type bascule.

Like several other bridges under construction during World War I, the Monroe project was slow to reach completion. This was due to several factors. Two years of planning had passed before construction commenced in 1915. Contracts for the bridge were let to two firms familiar to city jobs, the Fitzsimons & Connell Dredge & Dock Company (substructure), and the Ketler-Elliot Erection Company (superstructure). Both companies had significant experience building bridges for the city. Initially the project was supervised by the Union Station Company under the aegis of the City Engineer, but the Division of Bridges took over direction of the bridge construction in 1917. At this point, the cost of structural steel, cement, lumber, and labor rose alarmingly.[12] The bridge ultimately cost $525,447, a sizeable increase in total cost compared to bridges of similar size built for $285,558 at Webster Street and $286,033 at Belmont Avenue just three years earlier. Although there are limitations to making general comparisons between the cost of bridges, clearly expenses were skyrocketing. One year after the completion of the Monroe bridge, the cost of a new bascule at Franklin and Orleans Streets doubled the Monroe figure, at $1,073,556.[13] Labor strikes, court injunctions, and material shortages added to the expense and delay in completing the project. After four long years of construction, the Monroe Street Bridge formally opened to traffic in February, 1919.

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[11] Ultimately, the city's claim that the cross girder design was anticipated by earlier engineers was upheld in another patent infringement suit brougbt by Strauss against the City of Seattle in 1929. The Seattle defense team introduced two 1871 precision scales used by the U.S. Mint to weigb bullion that employed the identical cross girder support principal covered by the Strauss patent. According to an article in the *Engineering News-Record*, "in the decision banded down in San Francisco the Circuit Court of Appeals indicated that the judgement of the court in the Chicago case might be set aside by reason of anticipation of the cross-girder principal in the precision scales." "Eight Years of Litigation Over Seattle Bascule Bridges," *Engineering News-Record* 103 (19 December 1929): 968. Althougb the argument secured victory for the City of Seattle defense team, there is no evidence that the result in the Chicago case was changed in any way.

[12] Chicago Department of Public Works, *Annual* (1918), 131.

[13] Total cost of bridges taken from an unpublished table, "Summary of Bridge Specifications" found in the archives of the Chicago Department of Transportation, Bureau of Bridges and Transit.

During the six years between the initial design stage and the completion of the bridge, the forces spearheading the drive for a more artistic rendering of the city's bridges had gained greater strength and influence. Two of the foremost advocates of "an improved appearance" for the bridges, the Chicago Planning Commission and the Municipal Art Committee of the Illinois Chapter of the American Institute of Architects (AIA), had already directed the architectural treatment of three city bridges prior to their involvement in the Monroe Street project. Their pressure for a greater consideration of aesthetic concerns had a significant impact on plans for the bridge at Monroe Street. Historian Joan Draper found that the city had initially considered a single leaf bascule design proposed by the Sanitary District and the Association of Commerce for Monroe Street, but acquiesced to the CPC and AIA demands for a double leaf structure consistent with the other bascule bridges beginning to span the Chicago River.[14] The CPC and AIA also convinced the city to substitute granite and terra cotta in place of the concrete and copper in the plans for the operators' houses and enclosure walls. The bridge's octagonal, tile roofed operators' houses adorned with the familiar shell icon that appears in the city seal were typical of several bridges built from 1916 to 1922, including those at Webster, Belmont, Franklin-Orleans, and Wells streets.

There is little extant evidence to shed light on how the engineers of the Bridge Division reacted to the demands of the CPC and AIA. In their work, they tended toward pragmatism and economy. Without the intervention of the CPC, it is likely the Bridge Division would have built two ungainly vertical lift bridges at 12th Street and Lake Street. According to Thomas Pihlfeldt, Engineer of Bridges from 1901 until 1941, the Chicago type he helped develop had certain advantages, "it left a good, wide comfortable channel for vessels to go through" and was "very good in appearance, it helped to beautify a stream",but if called to construct a bridge over a wide river, Pihlfeldt's selection would have been a swing bridge, which was far cheaper to build than a bascule bridge.[15] Yet in general, the engineers acknowledged that the Chicago type bascule held greater potential from an aesthetic standpoint. Even in cases such as the Monroe Street Bridge where architectural alterations incurred delays in construction, Hugh Young's note that "this change will add greatly to the appearance of the bridge" typified most of the comments

[14] Joan Draper, *Edward H. Bennett: Architect and City Planner, 1874-1954* (Chicago: The Art Institute, 1982), 82. Incidently, the single leaf design would have circumvented many of the problems imposed by the proximity of the bridge to Union Station.

[15] United States Circuit Court of Appeals, 7th Circuit. *The Scherzer Rolling Lift Bridge Company v. City of Chicago and Great Lakes Dredge & Dock Company* no. 3606, 95 (October 1924).

pertaining to architectural treatment in the public record.[16] City Engineer John Ericson supported the efforts of the CPC to improve the appearance of the city's bridges in stronger terms. In a report given before the CPC, Ericson acknowledged their contributions: "Without this [the workof the CPC], we may not reach the goal for which we are striving, to make our beloved City of Chicago not only the greatest, but the most beautiful city on this continent, if not in the world."[17] While the CPC and AIA successfully carried out their architectural program at Monroe Street, aesthetic concerns were beginning to affect the appearance of bridge superstructure as well. In 1916, the Sanitary District built a Strauss bascule bridge at Jackson Boulevard with a gracefully curved, "deck-height" truss that supported the roadway. Compared to the bascules built by the Bridge Division, this bridge far more closely resembled the ones Bennett envisioned in his Chicago Plan – thus the Jackson Boulevard Bridge became a model of sorts, for what might be accomplished in future bridges near the Loop. City Engineer John Ericson recognized the aesthetic merit of the arched truss at Jackson, but cautioned that street grades at certain locations did not permit use of low, arched trusses or deck height trusses. Monroe Street was one such location. Young's design team considered the possibility of a "rail-height" truss, but such a low truss would not provide the required clearance between the bottom of the truss and the river.[18] While limited to the use of "pony" trusses instead of rail or deck height trusses, the Monroe trusses, like other city bridges built after the Jackson Boulevard Bridge, had a substantial appearance compared to the more spindly, angular trusses of the Washington Street, Grand Avenue and Chicago Avenue bridges. Here, engineering and aesthetics moved toward a convenient symbiosis, as the greater structural rigidity attained with wider structural members strengthened by riveted gusset-plates provided a rounded solidity better suited to the bridge's monumental architectural treatment.

Truss aesthetics, however, were in a transitional phase at this point. Although above the deck the trusses curved downward to meet at the centerline that divided the two leaves, at the truss ends and below the deck, the chords were angular and linear. City engineers had yet to fully embrace the curvilinear form characteristic of later pony truss bridges at LaSalle and Clark streets. Assessing the overall affect of the bridge's trusses, operators' houses, and masonry

[16] Chicago Department of Public Works, *Annual* (1916), 171.

[17] Chicago Planning Commission, *Proceedings of the Chicago Planning Commission* (1915), 841.

[18] Chicago Department of Public Works, *Annual* (1916), 171.

approaches, Draper aptly concluded that the Monroe Street Bridge "was the forerunner of later, more monumental and decorative bridges."[19]

Despite the bridge's importance to local businessmen, the official opening of the Monroe Street bridge slipped by without mention in the larger Chicago newspapers. Because the winter of early 1919 had been a particularly cold one, perhaps few people were willing to attend an opening ceremony in February with the kind of fervor characteristic of later bridge openings at Michigan Avenue and Franklin-Orleans streets. The official opening also marked the completion of one step in a larger project to connect the west side to Grant Park and the limited access highway planned for the lakefront. Traffic on Monroe Street could now cross the Chicago River and pass directly to Lake Shore Drive by way of a 1913 viaduct over the tracks of the Illinois Central Railroad. Opening up Monroe Street as a traffic artery was part of a radical transformation of Chicago's transportation infrastructure in the 1920s. During this decade, the city embarked on several major street widening projects, straightened a section of the Chicago River that had restricted north-south street traffic into the Loop, built a bi-level roadway (Wacker Drive), the first of its kind in the United States, and made plans for a new network of "superhighways" to improve the flow of traffic around the central business district.

Epilogue

The dawning of the automobile age in the first decades of the twentieth century added a certain urgency to the campaign to improve the circulation of traffic and commerce in the city. New bridges relieved congestion in the Loop, but did not fully anticipate the stresses that the ever-increasing numbers of vehicles would place on structural components. The additional wear caused by the heavy trucks and cars quickly revealed the inadequacies of existing roadway materials. In contrast to most other bridges built during World War I, however, the decking on the Monroe Street Bridge proved remarkably long lived. Not until 1946 did the city's maintenance section begin a major overhaul of structural components and re-deck the roadway with mineral-surfaced asphalt planks.[20] Overall, the annual reports of Bridge Division document a record of durable, relatively problem-free operation.

During its first decades of operation, the only significant repair work on the Monroe Street Bridge concerned four terra cotta pylons that stood on either side of the approach to the bridge, two on each bank of the river. Added as part of the architectural treatment of the bridge,

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[19] Joan Draper and Naomi Donson, *Chicago Bridges* (Chicago: Chicago Department of Public Works, 1984), 14.

[20] Chicago Department of Public Works, *Annual* (1946), 202.

the pylons were decorative, emblazoned with "Y" symbol of the city, but functional as well. Each pylon contained a "stop" signal that lighted before the bridge was opened. After thirteen years of service, the "cracked and dangerous condition" of the masonry sentries resulted in their replacement in 1932 with less decorative but more up to date and practical signal equipment.[21] Similar pylons built as part of the Franklin-Orleans Bridge, completed a year after the Monroe Street Bridge, experienced a similar fate in 1936.[22]

The major changes made to the bridge resulted from concerns that applied to all movable bridges owned by the city: the cost of maintenance and operation. At Monroe Street alone, the city paid annual salaries over $22,000 to bridge tenders in 1946, despite a decline in the number of openings per year over the previous decade.[23] In 1950, the city sought to cut operational costs associated with the movable bridges through a conversion to one-man operation. Nearly all the double-leaf bascule bridges built by the city to this point had two operator's houses, each house controlling the operation of one leaf. This arrangement was driven by technological factors as well as an aesthetic concern for symmetry. One of the first steps taken in the conversion process was to discontinue the practice of assigning bridge tenders to specific bridges. Instead, a roving band of tenders "leap-frogged" from bridge to bridge, raising and lowering the bridges as needed.

The second step involved concentrating all functions for controlling the bridge in a single operator's house. In one of the first attempted conversions at Monroe Street, engineers experimented with a technology just becoming available to domestic users: television.[24] A closed-circuit television system was installed to monitor pedestrian and vehicular traffic on the bank opposite the functional operator's house. Now superfluous, the western operator's house stands as an inoperative symbol of an earlier level of technology and architectural vision.

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[21] Chicago Department of Public Works, *Annual* (1932), 245.

[22] Chicago Department of Public Works, *Annual* (1936), 217.

[23] Like the other bridges on the main branch, the number of openings had dropped 40% from 1936 to 1947. Chicago Department of Public Works, *Annual* (1937), 316; (1946), 280-281.

[24] Chicago Department of Public Works, *Annual* (1952), 164.

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MONROE STREET VIADUCT
Chicago Bridges Recording Project
Spanning Metra tracks at East Monroe Drive
Chicago
Cook County
Illinois

HAER No. IL-152

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PHOTOGRAPHS

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
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Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD

MONROE STREET VIADUCT

HAER No. IL-152

Location:	Spanning the Illinois Central Railroad tracks at Monroe Street, in Grant Park, Chicago, Cook County, Illinois.
Date of Construction:	1939
Designer:	Lyman C. Riggle, Structural Engineer; Lawrence T. Smith, Resident Engineer; W. R. Weigler, Architect; Chicago Park District.
Builder:	Ketler-Elliot Company.
Present Owner:	City of Chicago.
Present Use:	Vehicular Bridge.
Significance:	The first Monroe Street Viaduct was built in 1913 to carry vehicular traffic across the sunken railroad tracks that slice through Grant Park on Chicago's lakefront. By the 1930's, this bridge was deemed to narrow to accommodate Chicago's increasing automobile traffic, and plans were made to replace it with a longer, wider structure. The straightforward steel girder and beam design that featured a subtle Art Deco architectural treatment for the approaches, lighting, rails, and ornamental fascia, reflecting an ongoing architectural transition in the city's bridges away from the Beaux Arts classicism that dominated earlier structures.
Historian:	Matthew T. Sneddon, June 1999
Project Description:	The Chicago Bridges Recording Project was sponsored during the summer of 1999 by HABS/HAER under the general direction of E. Blaine Cliver, Chief; the City of Chicago, Richard M. Daley, Mayor; the Chicago Department of Transportation, Thomas R. Walker, Commissioner, and S.L. Kaderbek, Chief Engineer, Bureau of Bridges and Transit. The field work, measured drawings, historical reports, and photographs were prepared under the direction of Eric N. DeLony, Chief of HAER.

Significance

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Chicago's Verdun

In the late 1930's, the sounds of a major construction project in Grant Park would have been a relative rarity. Montgomery Ward's celebrated fight some thirty years earlier to keep Grant Park free of buildings had largely succeeded: only a few structures at the very south end of the park had evaded the construction prohibition. Although during his lifetime Ward was vilified in his many legal battled to keep the lakefront area true to the federal and state admonitions in 1839 that the land should be "public ground; forever to remain free of buildings," by 1935 a newspaper likened his efforts to those of the French at the famous World War I battle at Verdun, whose stubborn resistance was immortalized by the words "they shall not pass"[1] The conflict over Grant Park lacked the sacrifice that gave those words much of their meaning, but it had lasting ramifications for Chicago's urban landscape.

Where developers failed to erect buildings, however, urban planners succeeded in bringing the vehicle into the garden by turning the park into an important transportation network. Lake Shore Drive, once envisioned as a casual promenade to carry carriage traffic on a Sunday afternoon jaunt through the park, was transformed by the arrival of the automobile. Lake Shore Drive soon became a popular avenue for the "motoring crowd." Lake Shore Drive, however, was separated from the core of the city by a series of lake front parks including Grant Park and Jackson Park. Access to the drive through Grant Park was complicated in 1912 by the agreement of the Illinois Central Railroad to submerge its railroad tracks that cut through the heart of the park. To bridge the sunken tracks, viaducts were planned for Congress, Jackson, and Monroe streets, the latter of which was finished in 1913. With the viaduct in place, motorists could move easily from the downtown business district known as the Loop to Lake Shore Drive via Monroe Street. The presence of the automobile in the park was increased with the completion in 1917 of a large asphalt parking lot in the north end between Monroe Street and Randolph Street. By the late 1930's, especially after the construction of a bascule bridge across the Chicago River in 1937, Lake Shore Drive was a major traffic artery, and the 34 foot wide roadway of the 1913

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[1] *The Chicago Daily News*, "How Grant Park Was saved for People; Ward's Great Fight Waged 21 Years," (8 June 1935), 5.

viaduct was an obvious bottleneck. Thus as the 1930s came to a close, Grant Park was an unusual sort of park; it was partly a green landscape, a formalized contrast to the intimate urban density of the Loop, partly an important rail connection, and partly a system of busy thoroughfares.

Fighting the Depression with Construction

At the same time the old viaduct was becoming more burdensome to vehicular traffic, the Great Depression was weakening the city's capacity to fund public works construction. The park districts that controlled construction in parks such as Grant park were hard hit, all "plagued by severe economic problems, resulting particularly from the decrease of property values and subsequent decrease of the tax base."[2] During the depression, cities like Chicago looked to federal agencies such as the Public Works Administration (PWA) to fund the creation of jobs and infuse capitol into urban economies. A major beneficiary of such largesse, the city used federal funding to improve waterworks, lakefront erosion, and build bridges. By 1939 the government was phasing out the PWA, but the Depression had not yet relinquished its hold on the nation's, or Chicago's, economy. In the twilight years of the PWA the city managed to tap it for 45% of the construction costs of the replacement viaduct at Monroe Street. Thus the bridge is significant in that it represents a significant phase in U.S. history when the Democratic Party turned to a controversial approach, that of New Deal programs such as the PWA to fund municipal construction projects, in the hope of sparking a national economic recovery.

Because the viaduct was in Grant Park, its construction and maintenance fell under the jurisdiction of the newly created Chicago Park District (CPD). Formation of the CPD in 1934 consolidated twenty-two separate park districts, each with separate taxing powers, into a single entity. Its responsibilities were numerous. The CPD was charged with policing, lighting, maintaining and engineering in the parks, which included building all bridges and boulevards in its territory. The Monroe Street project was supervised by two Park District engineers, Lawrence T. Smith and Lyman C. Riggle. The two engineers also consulted with representatives from the PWA.

The Park District engineers studying the replacement of the old reinforced concrete viaduct found it too narrow and too steep. The new steel girder and beam viaduct reduced both the grade of the approach (from 11% in some places to 4.4%) and the longitudinal crown by increasing the length of the deck. Steel beams cantilevered over the main girders and concrete abutments provided the greater width which widened the roadway from 34 feet to 60 feet. Its overall length and width were 282 feet and 85 feet, respectively. Although the CPD made every effort not to impinge on rail and pedestrian traffic, occasionally the two railroad companies, the Illinois Central and the Michigan Central were called on to assist in the construction. Provisions were also made to shield the bridge from smoke and steam, but the trains were largely electric

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[2] Chicago Park District, "The Historic Resources of the Chicago Park District," National Register of Historic Places, Multiple Property Documentation Form (1990), section E, page 14.

powered at this point. Perhaps the most interesting features of the new bridge were the pinned hangers used as expansion joints and steel "I Beam Lok Deck" that when filled with concrete provided lighter but stronger surface then the old deck.

The engineers decided to save time and the expense of erecting completely new foundations and supports by utilizing the original piers and abutments. Because some of the piers were skewed to accommodate railroad tracks, the designers placed the expansion joints to cut diagonally across the deck to match the skew.[3]

Although the new viaduct was estimated to cost some $439, 200, it was completed for approximately $235,000. These estimates were important, for the PWA set limits based on the estimate for their maximum contribution. In January 1939, six months after the bids were opened in August 1938, the final estimated cost of the bridge was reduced to $264,300. Although it is not clear what prompted the reduction, perhaps either low bids, the low cost of labor, or the retention of the original foundations were contributing factors.[4]

The project's simple and functional architectural design by W. R. Weigler was influenced by the Art Deco movement that gained momentum in the 1930's. As described by the National Register of Historic Places nomination form, the bridge in 1999 differs little from its original appearance.

> The Art Deco structure is detailed primarily in steel with granite abutments. The long rail spanning the bridge has five uninterrupted horizontal bands. The supports are composed of groups of three vertical elements. The granite abutments are approximately 6 feet tall. They include one vertical rectangular slab set within a more horizontal slab with a semi-circular end. Placed on top of the abutment is a small bronze cylinder accented by four fins. On the exterior span of the bridge are a series of medallions consisting of two concentric squares with three slash lines running horizontally through them. The original color scheme of the bridge accented the details of the bridge. The four rails were painted silver and the supports were painted black Enhancing the horizontality of the element. The exterior span of the bridge was also painted black and the medallions were painted silver. While all The elements are still extant, the entire bridge has been painted gray, muting the design of the bridge.[5]

Art Deco, typified by geometric forms, streamlined design, vibrant colors, and peculiar surface

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[3] Lawrence T. Smith and Lyman C. Riggle, "Bridging Busy Electrified Tracks," *Engineering News-Record* vol. 125 (15 August 1940): 210-12.

[4] *Journal of the Proceedings of the Board of Commissioners of the Chicago Park District*, vol. 5 (10 January, 1939): 608.

[5] Chicago Park District, Grant Park National Register of Historic Places Registration Form (1992), section 7, page 10.

ornamentation, represented a significant architectural departure from earlier public works in Chicago that largely adhered to the Beaux Arts classicism set forth by the Chicago Plan of 1909. The Chicago Plan, composed by well known architect D. H. Burnham and his assistant Edward Bennett, was a seminal work in urban planning and reflected the lingering influence of the 1893 Columbian Exposition and the hope that Chicago's growth could be rationally planned. It gained the support first of the influential Commercial Club of Chicago, then of municipal government, which created the Chicago Plan Commission with Bennett as a architectural consultant to implement the plan. The significance of these developments for Chicago's bridges was that with Bennett largely in control of architectural design, the Beaux-Arts classicism he imbibed at Ecole des Beaux-Arts in Paris and put to practice in his years with D.H. Burnham's firm was applied to many bridges on the Chicago River built by the city between 1914 and 1930. By 1930, Bennett's influence was fading. Ironically, his last bridge design for the city, the bascule bridge at Wabush Avenue, hinted at the Art Deco form that was steadily gaining favor. Three years later, Chicago hosted another world's fair with the theme "A Century of Progress," a new architectural theme that drew on Art Deco. Just as bridges of an earlier era matched architectural themes previewed at the Columbian Exposition, Chicago's bridges in the late 1930's including the Outer Bridge and the Monroe Street Viaduct, expressed the modernist imagery of Art Deco on display at "A Century of Progress."

The Monroe Street Viaduct still stands astride the northerly edge of the Art Institute of Chicago much as it did in 1939. From and engineering standpoint, it is a relatively straightforward steel girder and beam construction with a few interesting features, but its main significance lies in its relation to the development of Grant Park and transportation along the lakefront, to the New Deal programs enacted to counteract the Great Depression, and to the transition in Chicago bridge architecture in the 1930s.

Sources Consulted

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