HAER
ILL
16-CHI
135-

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

HAER No. IL-52

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
P.O. Box 37127
Washington, D.C. 20013-7127

HAER
ILL
16-CHI6,
135-

HISTORIC AMERICAN ENGINEERING RECORD

Index to Photographs

CHICAGO RIVER BASCULE BRIDGE, HAER No . IL-52
WELLS STREET BRIDGE
I&M Canal National Heritage Corridor
Chicago
Cook County
Illinois

NOTE: Photographs taken by Jet Lowe, photographer, 1987

IL-52-1 INTERIOR OF BRIDGE TENDER'S HOUSE.

IL-52-2 DETAIL OF TRUNNION GIRDER.

IL-52-3 DETAIL OF MOTOR GEAR SET FOR LIFT SPAN.

IL-52-4 DETAIL OF COUNTERWEIGHT.

HAER
ILL
16-CHIG
135-

HISTORIC AMERICAN ENGINEERING RECORD

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

HAER No. IL-52

Location:	I & M Canal National Heritage Corridor North Wells Street across Chicago River (South Branch) Chicago, Cook County, Illinois UTM: 16 E.447400 N.4637250 Quad: Chicago Loop
Date of Construction:	1922
Designing Engineer:	Bureau of Engineering, Chicago Department of Public Works
Builder:	Substructure, Fitzsimons & Connell Dredge and Dock Company Superstructure, Ketler and Elliot Company (Steel fabricated by Fort Pitt Bridge Company)
Present Owner:	City of Chicago
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 Wells Street Bridge is the longest of three double-deck, double-leaf, bascule bridges built over the Chicago River.
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.
Historians:	Charles Scott, Frances Alexander, and John Nicolay, 1986.

The Wells Street Bridge, designed by the City Engineer of Chicago, was the twenty-third bascule bridge constructed across the Chicago River. The Wells Street Bridge was designed to replace the swing span bridge at the site. In order to minimize disruption to railroad traffic using the swing span, the new bridge was erected in the open position. The Substructure was built by the Fitzsimons & Connell Dredge and Dock Company with the steel fabricated by the Fort Pitt Bridge Company. The Ketler and Elliot Company erected the bridge. The bridge was placed in operation on December 4, 1921. Of the three double-deck, double-leaf, bascule bridges built across the Chicago River before 1922 (the other two are the Michigan Avenue and Lake Street Bridge), the Wells Street bridge is the longest.

As mentioned, the Wells Street bridge is a double-deck, double-leaf, fixed trunnion bascule bridge. The bridge measures 268'-0" from center to center of the trunnions, and has a clear span of 231'-0". The superstructure consists of a through truss with riveted gusset-plate connections. The bridge carries the double-tracked, Chicago Elevated Railway on the upper level. Roadway and sidewalks on lower level have a combined width of 72'-0". Each leaf has a concrete counterweight pit, 48' x 48' and 31' below the water level, supported by six concrete piers. The plan of the two granite-faced bridge tenders' houses (one on each side of the bridge) is octagonal. The houses have a row of one-over-one-light, double-hung, sash windows beneath the cornice and a denticulated cornices. The roofs are hipped with simulated tile (the material is tin) and the crowns have a shell motif.

SOURCES:

"Chicago Double-Deck Drawbridge with Elevated Railway," Engineering News-Record, v. 88 (April 6, 1922): 567-571.

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

"Handling Traffic on Chicago 'L' During Bridge Replacement," Electric Railway Journal, v. 58 (December 24, 1921): 1113-1115.

"Putting Large Bascule in Service," Engineering News-Record, v. 87 (October 13, 1921): 606-607.

HAER
ILL
16-CHIC
135-

ADDENDUM TO:
CHICAGO RIVER BASCULE BRIDGE, WELLS STREET
Illinois & Michigan Canal National Heritage Corridor
Chicago Bridges Recording Project
Spanning the Chicago River (S. Branch) at N. Wells Street
Chicago
Cook County
Illinois

HAER No. IL-52

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
U.S. Department of the Interior
1849 C St. NW
Washington, DC 20240

HAER
ILL
16-CHIG
135-

HISTORIC AMERICAN ENGINEERING RECORD

CHICAGO RIVER BASCULE BRIDGE, WELLS STREET BRIDGE
(I&M Canal National Heritage Corridor)

HAER No. IL-52

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

Location:	I&M Canal National Heritage Corridor Spanning the Chicago River (S. Branch) at N. Wells Street Chicago, Cook County, Illinois. UTM: 16 E.447400 N.4637250 Quad: Chicago Loop
Date of Construction:	1922
Designer:	Thomas G. Pilhfeldt, Engineer of Bridges, Division of Bridges, City of Chicago.
Builder:	Substructure, Fitzsimons & Connell Dredge and Dock Company Superstructure, Ketler-Elliott Erection Company.
Present Owner:	City of Chicago.
Present Use:	Vehicular bridge.
Significance:	The few double-decked bascule bridges designed by the City of Chicago's Bridge Division were particularily important links within the city's transportation infrastructure. The upper deck of the Wells Street Bridge, like that of the double-decker at nearby Lake Street, carried elevated trains across the Chicago River in addition to regular pedestrian and vehicular traffic.
Historians:	Charles Scott, Frances Alexander, and John Nicolay, 1986; Matthew T. Sneddon, 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.

Introduction

The few double-decked bascule bridges designed by the City of Chicago's Bridge Division were particularly important links within the city's transportation infrastructure. The upper deck of the Wells Street Bridge, like that of the double-decker at nearby Lake Street, carried elevated trains across the Chicago River in addition to regular pedestrian and vehicular traffic. The two bridges shared more than their function as an elevated connection; in many ways the Wells Street Bridge was derived from the earlier Lake Street design. As a near duplicate, the Wells Street Bridge represented less a pioneering work of engineering than a refinement of existing designs, architectural treatment, and innovative construction techniques.[1]

Bridge Hlstory

Wells Street has long been an important crossing point between the northern and southern sections of the city separated by the main branch of the Chicago River. Consequently, the location was a frequent site of new developments in movable bridge technology. After a flood in 1849 destroyed the original 1841 float bridge, the city reestablished access with an early example of a center-pier swing bridge in 1856. This hand-operated, wood truss bridge also met an untimely end in the 1871Chicago fire, and was rebuilt a year later with an iron superstructure. In 1888, the city replaced the bridge with a longer, steam-powered, steel span of the same type. The majority of Chicago's steam-powered bridges only operated for about a decade until 1896-1897 when electricity became the favored source of power. One of the first swing bridges converted to electric power, the Wells Street Bridge also received a second deck in 1896, an addition paid for by the Chicago Northwestern Elevated Railroad to carry their elevated line.[2] Since 1896, only two bridges, the double-decked bridges at Wells Street and Lake Street, have carried elevated traffic into Chicago's central business district.

The elevated connection at Wells Street proved both a source of special significance and formidable problems. Because traffic on the elevated lines could not be diverted without great

[1] By agreement the city operated and maintained two double-deck bascules built in a joint venture by the Lincoln Park Commission and the South Park Commission in 1939. Although the Strauss Engineering Corporation was awarded the contract, former City of Chicago Engineer of Bridge Design Hugh E. Young consulted on the project, and lhe bridge closely resembled a Chicago-type bascule.

[2] Well-known bridge engineer J.A.L. Waddell was a consultant on this modification. Wells Street Bridge Drawing File, Chicago Department of Transportation, Bureau of Bridges and Transit.

expense, replacement of double-decked bridges presented the engineers with the difficult task of maintaining elevated service during construction. The urgency of finding a solution was heightened when the United States Department of War deemed many of the swing bridges on the Chicago River obstructions to navigation and ordered their removal. As the removal order was eventually extended to both the Lake Street and the Wells Street swing bridges, the problem of how to maintain the flow of traffic during the replacement process loomed large.

A solution to the traffic problem was devised by Thomas G. Pihlfeldt, bridge engineer. The Norwegian-born Pihlfeldt had first entered into service with Chicago's Department of Public Works in 1889, rising through the ranks to Engineer of Bridges by 1901. Together with John Ericson, City Engineer, Edward Wilmann, Engineer of Bridges, Karl Lehman and Alexander von Babo Bridge Engineers, Pihlfeldt had been instrumental in developing the first simple trunnion bascule design that later became widely known as the "Chicago Type."[3] In the next decade, Pihlfeldt supervised the design of several bascules, becoming a leading figure in the development of the Chicago Type. While some Bridge Division engineers like Hugh Young used the position of Engineer of Bridges as a step toward a more visible role as "public engineer," the modest Pihlfeldt spent his lengthy career in the Bridge Division.

When the first order to remove the Lake Street Bridge came in 1909, Pihlfeldt admitted that the problem of replacing the bridge initially had him stumped. An assessment revealed an immense volume of traffic on the bridge. In a twelve hour period, between seven in the morning and seven at night, 3,180 motorized vehicles, 1,000 elevated trains, 850 horse teams, and 7,000 pedestrians passed over the bridge.[4] Clearly, the traffic requirements of the location called for a new approach. After rejecting proposals for temporary structures, Pihlfeldt and his team of engineers hit on an innovative solution. Essentially, they left the existing swing bridge in place as long as possible, and built the new bascule around it, in a fully vertical, elevated position. In this manner, elevated service was maintained across the old swing bridge and through the raised trusses of the new bridge under construction. As the replacement project neared completion, the old swing was cut away, and the leaves of the new bridge were lowered to the closed position so work could begin on the decking. Construction of the upper decking and elevated rails suspended rail service for only one week, and the project was hailed as a great success.

[3] Name variously recorded as Wilman (Scherzer trial, 66); Wilmann ("The Chicago Type of Bascule Bridge" *Engineering Record* 42, no. 3 (21 July 1900): 50; and Willmann ("Trunnion Bascule Bridges with Fixed Counterweights: *Engineering and Contracting* 39, no. 16 (16 April 1913): 426

[4] Thomas Pihlfeldt, "The Wells Street Bridge" *Journal of the Western Society of Engineers* 27 (February 1922): 59.

When the plans moved forward in 1916 to replace the swing bridge at Wells Street with a double-decked bascule, Pihlfeldt merely reapplied the formula that had worked so well at Lake Street. His chief aim with the second attempt was to improve the timing of construction, thereby shortening the duration that the bridge was closed. This project was complicated by the U.S. entry into World War I. While many sectors of American industry profited from the demands of war, construction in Chicago suffered from periodic labor strikes, shortages in crucial materials and sharp increases in the cost of structural steel, cement, lumber, and labor.[5] Such factors pushed expenditures for the Wells Street project far beyond its original budget. As the city scrambled to find the funds to complete the bridge, they discovered a major flaw in the agreement negotiated with the Chicago Northwestern Elevated Railroad to help pay for the bridge. According to city officials and the Chicago Northwestern Elevated Railroad, both sides understood that the elevated line was to pay one-third of the cost of the bridge. Unfortunately for the city, the Chicago Northwestern maintained that they would contribute their share only upon completion of the bridge.[6] By April 1921, work on all bridges ceased as the city's coffers were exhausted. Ultimately Chicago's only recourse was to propose a new bond to cover the cost of overruns, which delayed the issue of existing bonds for two other bridges planned at Western Avenue and Ashland Avenue.[7]

When funds finally became available to finish the Wells Street Bridge, the tightly controlled construction process resumed, building to a climax the weekend of 2 December 1921. At 7:00 p.m. Friday evening, the work crew closed the old bridge, and began to remove the elevated rails. Floodlights lit the construction site as darkness approached, and the flooring of the new bridge moved toward completion. Nearly round-the-clock work succeeded in cutting away the central portion of the swing bridge, installing new rails, removing approaches and adding new approaches in time to resume elevated service for the Monday morning rush hour.[8] While pedestrian and vehicular traffic on the lower deck remained closed until February 1922, Pihlfeldt's team reached their goal. Compared to the Lake Street project, elevated service was interrupted for three days instead of one week, and construction of the lower deck was shortened by several months. The unique construction process attracted attention in the engineering

[5] Chicago Department of Public Works, *Annual Report of the Chicago Department of Public Works* (1918), 131.

[6] "'L' Debts for Bridges Unpaid," *Chicago Journal* (1 April 1921).

[7] "Bridge Building Stops; No Money," *Herald Examiner* (30 March 1921).

[8] "Handling Traffic on Chicago 'L' During Bridge Replacement" *Electric Railway Journal* 58 (24 December 1921): 1113.

journals, and the two bridges held a place in Pihlfeldt's memory as his proudest accomplishments in the city's service.[9]

The Wells Street Bridge followed the Lake Street example in more than its method of construction as much of the later bridge's design was derived from its double-decked predecessor. To city engineers, the double-decked bridges were merely minor variants of an existing simple trunnion bascule design that they had been developing since the turn of the twentieth century. The bascules at both Lake Street and Wells Street shared an ancestry with the original city-designed bascule built at Cortland Avenue in 1902. Each bascule incorporated many of the developments that improved the appearance and operation of Chicago bascules in following years. Indeed, the city was forced to defend the basic similarity between their single deck and double deck designs in a lawsuit brought about by Scherzer Rolling Lift Bridge Company in 1924.

William Scherzer had been one of the early entrants into the bascule bridge business in Chicago. The timing of his patent for a rolling lift type bascule coincided with a period in the 1890s when the tide of objections to the existing center-pier swing bridges on the Chicago River began to rise. The movable leaves in a rolling lift type opened by rolling backwards on curved girders, "just like the rim of a large wheel would roll on a track."[10] Scherzer secured a contract from the City of Chicago to build his rolling lift bridge at Van Buren Street in 1895. The Van Buren Street Bridge served as an example to the city that a bascule type could be a practical alternative to a swing type. The successful bridge operation gained Scherzer several contracts for city and railroad bridges in Chicago, including those built at Taylor, Harrison, Randolph, and North Halstead streets. From 1895 until about 1905, one report observed, Scherzer had the movable bridge business in Chicago practically to himself.[11]

---

[9] "Handling Traffic on Chicago. Thomas Pihlfeldt, "The Wells Street Bridge"; "Chicago Double-Deck Drawbridge with Elevated Railway," *Engineering News-Record* 88 (6 April 1922): 567-71; "Putting Large Bascule in Service," *Engineering News-Record* 87 (13 October 1921): 606-7. In *Sago in Steel and Concrete: Noreweigan Engineers in America*, Kenneth Bjork reports that "in the many interviews granted by Pihlfeldt during his long term as bridge engineer, he spoke most frequently of the erection of the Wells Street Bridge. His quiet pride in this bridge is understandable. . . ." (Northfield, MN: 1947), 129.

[10] Chicago Department of Public Works, *Annual Report* (1906), 272.

[11] "The Strauss Trunnion Bascule vs. The Scherzer Rolling Lift," unpublished report, Green Bay Department of Public Works, no date, page 1.

After a few years of service, however, the city engineers questioned the Scherzer design's durability and suitability for Chicago's peculiar substratum. Because the center of gravity moved as the bridge opened or closed, the rolling lift principle required solid foundations and stable soils, a poor match to the soft and swampy ground near the Chicago River. The engineers also noted several defects in the design that were revealed during the bridges' early years of operation, especially problems related to the curved girders and the track plates upon which they rolled. As the bridge opened or closed, the entire weight of the leaf was transmitted onto the relatively small surface area of the curved girder as it contacted the track, resulting in enormous point loads. At the points of contact, the steel plates frequently deflected and failed. Although the Scherzer engineers later tried to remedy the problem with more substantial designs, the brief reign of the Scherzers in downtown Chicago was over by 1905, when the simple trunnion design became the favored type of bascule. Scherzer protested this action in the local presses, arguing that the city was wasting money as his bridges were cheaper to build. To justify their course, the city engineers produced a damning record of the performance of Scherzer bridges, and later supported a rival design, the Strauss bascule, in the national bridge market.[12]

Several years later when the city began to build the double-decked Michigan Boulevard Bridge, the Scherzer Company seized another opportunity to challenge the City of Chicago and to gain a measure of retribution for their earlier setback. This time the battle was contested in the courts, as the Scherzer Company filed a patent infringement suit against the city as it moved forward with plans for the bridge in 1918. The Scherzer Company charged that the design infringed on a patent granted in 1903 for a double-decked bascule bridge. Particularly rankling to the Scherzer Company was the fact that they had sent a complimentary copy of a book to the city's Bridge Division as early as 1901,describing a potential double-decked bascule to span LaSalle Street, and also submitted a design for a double-decked bascule to Henry Dietrich, president of the Board of Local Improvements, for the Michigan Boulevard project in 1908. Now it seemed the city was borrowing the ideas they had provided in good faith.

Testimony during the trial, however, revealed that the city engineers had considered extending the principles of a single decked bascule to the double-decked configuration several years before any construction of such structures took place. City Engineer John Ericson

[12] The following are unpublished materials obtained from the Green Bay Department of Public Works archives: "Extract from Bridge Engineer's Report of Mayor of Chicago's Message, 1907," Karl Lehmann, "Extract from Report on Parallel Design of Strauss and Scherzer Bridges, dated 27 May 1912, for the Indiana Street Bridge, Chicago," "Conclusions of Report by City Engineer of Chicago, dated 24 May 1912, regarding the Scherzer Rolling Lift Bridge," Thomas G. Pihlfeldt, "Bridges: So. California Ave. Subject: Design." (18 November 1919). My thanks to Jeff Hess for providing these sources.

remembered that even in the early stages of the development of the Chicago-type, the possibility of a double-decked application was discussed.[13] Pihlfeldt affirmed that Bridge Division engineers had considered a double-decked bascule at Lake Street in 1895, and took up a proposal in 1898 for a similar structure at Kinzie Street at the request of the Commissioner of Public Works. Plans and a preliminary drawing of the proposed bridge were produced in 1901.[14] More importantly, the lawyers representing the city successfully argued that the 1903 Scherzer patent did not constitute patentable invention; instead, the city's design merely followed well-established principles and represented "the demonstration of mechanical skill upon the part of a competent or efficient bridge engineer."[15] Ultimately, the courts sided with the opinions of the witnesses from the Bridge Division, ruling that the design of the double-decked bridge entailed little deviation from the methods and principles worked out from the single-decked version in essence, it was just "a little more work in detail."[16]

Technical Matters

No matter how much the city engineers might have tried to brush aside the differences as "just a matter of working out the details," the double decked bascules embodied important deviations from the usual Chicago-type design. One of the strengths of the Chicago type was that it allowed engineers to place the break in roadway (the break that separated the movable leaf from the street approach) just in front of the trunnions. In this arrangement, the movable leaf formed a barrier to approaching traffic when raised, leaving only a few inches gap between the leaf and the road. Some other designs for movable bridges, such as Scherzer's rolling-lift bridge, left a sizable space between the roadway and the raised leaf that an unwitting pedestrian or horse team might fall into. Despite barriers and policemen manning the approaches to bridges of this type, accidents occurred, and engineers were not alone in considering it a flaw in design.

In the double deck configuration, placement of the roadway break in front of the trunnions was less feasible. Indeed, both the Lake and Wells Street bridges had a roadway break to the rear of the trunnions. As a result, the downward rotation of the lower deck during the

---

[13] *The Scherzer Rolling Lift Bridge Company vs. City of Chicago and Great Lakes Dredge & Dock Company*, U.S. Court of Appeals, 7th circuit, case no. 3606 (October 1924) 63. Thanks to Jeff Hess for uncovering and sharing the materials related to the various lawsuits the city's Bridge Division periodically became embroiled in.

[14] *The Scherzer Rolling Lift Bridge Company*, 93, 97.

[15] *The Scherzer Rolling Lift Bridge Company,* 175.

[16] *The Scherzer Rolling Lift Bridge Company,* 90.

raising of these double-decked bridges created a dangerous opening into the some forty-foot deep tail pit. Curiously, Bridge Division engineer Donald Becker states that no preventive steps were initially taken. Only later were various types of barriers installed to keep the bridge clear of street traffic during openings.[17]

The placement of roadway break also affected the bridge's loading. When fully closed, a typical Chicago-type, single-decked bridge with the roadway break ahead of the trunnion bearings resisted live loads at three points: the trunnion bearings, the front pier live load bearing, and the rear truss bumper. (loads other than the dead weight of the bridge, such as those imposed by traffic or weather) All significant live loads pressed downward on the movable leaf in the closed position, thus tending to keep the bridge closed. In cases where the roadway extended behind the trunnions, such as the city's double-decked designs, live load on this rear portion of the deck forced the bridge up. To counteract this force, engineers devised a rear-locking device to hold the bridge closed when load was applied to the decking behind the trunnions. Engineers introduced an "elbow lever" type of rear lock, or "heel lock," at the Lake Street Bridge that provided a model for similar designs used in the double-decked bridges at Michigan Avenue, Wells Street, and Outer Lake Shore Drive.

Double-decked bridges were also much heavier than their single decked kin. The additional weight influenced the design in several ways, noticeably in the supports, substructure, and braking systems. The considerable length of the Wells Street span compounded the weight concerns, making for extremely high trunnion loads. Pihlfeldt's engineering group countered the high loading with a new structural system that combined a cross girder with a set of supporting columns built into the tail pit walls underneath the trunnions. This system represented one of the few departures from the Lake Street design, which had employed an unusual triangular truss to support the cross girder. In both cases, the engineers carried the tail pit foundation piers down to bedrock to bear the heavier load.

Dynamic loading during bridge openings presented the question of how the operating machinery would handle the stress of the higher live loads. To avoid damaging the machinery and bridge supports, it was necessary that a bridge reach its full opened or closed position slowly. Engineers initially designed a supplementary braking system attached to the tail ends of the trusses, similar to one in the double-deck Michigan Avenue Bridge, to control the speed of the bridge leaves during an opening. Later they decided the design was impractical. Leaving the operating machinery to cope with the more extreme demands of the double-decked leaves caused some distress in the gear train, which was eventually rectified by replacing parts with higher

[17] Donald Becker, "Development of the Chicago Type Bascule Bridge" *Proceedings of the American Society of Civil Engineers* (1943): 283.

strength steels than those originally used.[18]

Despite the differences, the city's double-decked bridges borrowed their basic design from the "second generation" of the single-decked Chicago type that emerged after 1913. The second generation differed from the first generation because of changes in the operating machinery, in structural support systems that allowed use of a larger, cheaper form of counterweight, and in foundation supports. (particularly those relating to an internal rack and pinion system developed and patented by Engineer of Bridge Design Alexander von Babo in 1908). The operating machinery for each leaf utilized the patented rack and pinion system mounted internally within the rear end of the truss and driven by two separate drive train and direct current motor units. To allow for failures or scheduled maintenance a one hundred horsepower 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. In the upper level of the operator's house, the bridge tender controlled the electric motors, center-lock mechanisms, and brakes that slowed the speed of the movable leaf as it reached the fully open or fully closed position.

At the same time engineers were developing a second generation Chicago type, the appearance of the city's bridges changed dramatically. Early in the twentieth century, architectural and art organizations had been quick to recognize the civic value of the bridges, and urged consideration of the architectural effect of these public works. City engineers ignored the first calls by the Municipal Art League for a more artistic rendering of the city's bridges, but with the publication of Daniel Burnham and Edward Bennett's *Chicago Plan* in 1909, the movement gained new direction. Chicago Architects Burnham and his assistant Bennett, sponsored by the Commercial Club of Chicago, were chosen to guide the future development of the city. Charles H. Wacker, Chairman of the Chicago Plan Commission explained that the plan was based on the belief that if Chicago was to become "the greatest and most attractive city of this continent, its development and improvement should be guided along certain definite and pre-arranged lines, to the end that the necessary yearly expenditures for public improvements may serve the needs of the future."[19] Charged by the city with carrying out the *Chicago Plan*, the Chicago Plan Commission (CPC) drew its membership from the city's prominent citizens, and exercised considerable influence over the future architectural treatment of the city's bridges and surrounding approaches.

---

[18] Becker, "Development of the Chicago Type Bascule Bridge", 284.

[19] Francis A. Eastman, *Chicago City Manual* (Chicago: Bureau of Statistics and Municipal Library, 1911), 141.

The *Chicago Plan* and its supporters initiated a transition in Chicago bridge architecture. Previously, little attention had been paid to the appearance of the bridges, particularly in regard to the operators' houses, which were typically simple, unadorned wooden box houses attached to one side of the bridge at the foundation abutments. Such utilitarian structures were a long way from the neoclassical, beaux-arts bridges Burnham and Bennett imagined as the impressionable gateways to the city. The first step toward more monumental bridges was taken during World War I when concrete replaced wood for the operator's houses. After the war, stone-cladding gained wider use in the bridge approaches and operator's houses, and greater attention was paid to the aesthetics of the bridge trusses. Between late 1920s and early 1930s, another phase of bridge architecture was typified by beaux arts style operator's houses with limestone bases and lead mansard roofs at Adams, LaSalle, Clark, and Wabash Bridges. These bridges constituted perhaps the fullest expression of Bennett's architectural program.

Wells Street stood directly in the middle of these developments. Because of its double-decked through-truss superstructure, the Wells Street Bridge stood out structurally from most other bascules on the Chicago River, but the architectural treatment of the approaches and operator's houses followed a beaux arts-inspired design characteristic of several recent bridges built nearby. Indeed, Bennett's plan emphasized unity and harmony in the architectural treatment of bridges near the Loop. The most obvious model was down-river at Lake Street. The Lake Street design established a rough pattern used for the operator's houses of several bridges built between 1916 and 1922. These houses had octagonal floor plans, masonry (simulated or genuine) bases, and tiled, pyramidal roofs commonly crowned with a shell motif emblematic of the city seal. Wells Street marked an improvement on the earlier designs. The operator's houses were built with granite facing rather than the concrete used at Lake Street, and it is easy to agree with one critic that the architectural elements at Wells Street are "more handsome by far" than those at Lake Street.[20]

[20] Joan Draper and Naomi Donson, *Chicago Works Bridges* (Chicago: City of Chicago, Department of Public Works, 1984), 97.

Epilogue

In 1944, the Division of Bridges and Viaducts estimated that the life of a movable bridge "may be taken as forty or fifty years."[21] At the twentyfirst century, the Wells Street Bridge will have been in service for seventyeight years, with no replacement planned for the near future. The longevity of the early Chicago type bridges is due in part to rugged design and annual maintenance combined with a program of modernization that kept the bridges apace with technological developments of the twentieth century. Higher strength steel, steel decking, telephones, improved controls, and, in some cases, closed circuit televisions are just a few of the technologies added to the movable bridges as part of city's "modernization and reconstruction" efforts. In particular, the original bridge decks proved inadequate to handle the increased weight of vehicles since 1920. The lower roadway deck of the Wells Street Bridge received a new steel and concrete deck during the 1950s as part of a comprehensive plan to update the decks of the city's bridges.[22]

The importance of the Wells Street Bridge to the smooth flow of traffic in the central business district was revealed by the occasional accidents and breakdowns that put the bridge out of service. Like many movable bridges on the Chicago River, the Wells Street Bridge was on one occasion damaged by a ship. On a foggy morning in November 1935, the sand boat "S.S. Dahlke" collided with the bridge, damaging the trusses, sidewalk, and railings.[23] One newspaper article in August 1936, reported with an air of exasperation that a recent bridge failure was "third time within ten days that the bridge has been closed for repairs."[24] With one leaf stuck in the opened position, boats began to back up on the river, elevated passengers were forced to seek another route across the river, and street traffic was jammed in both directions. In 1941, a similar problem closed the balky bridge again.[25] Less unexpected repairs have also been made to the

[21] Chicago Department of Public Works, *69th Annual Report of the Chicago Department of Public Works* (1944), 170.

[22] Chicago Department of Public Works, *77th Annual Report* (1952), 164. Drawings nos. 18654-57.

[23] "Boat Wrecks Wells Street Bridge in Fog," *Chicago Tribune* (15 November 1935), 1.

[24] "'L' Passengers Walk as River Bridge Jams," *Chicago Tribune* (15 August 1936), 1.

[25] "Bridge jams, 'L' is delayed," *Chicago Daily News* (12 April 1941).

bridge as part of regular maintenance, including substantial rehabilitation projects in 1968 and 1992.[26]

The movable bridges have become familiar landmarks in Chicago's Loop, a distinctive component of the city's physical identity. Yet as early as 1923 the city council ordered an investigation of adopting a "fixed bridge" policy on the Chicago River to reduce the costs of operation and maintenance. In 1932, Commissioner of Public Works Colonel A.A. Sprague submitted a more detailed study titled "Waterway Developments, Barge Terminals, and Bridge Clearances" that also took up the fixed bridge question. Pihlfeldt and Hugh Young, fellow bridge engineer, contributed to the report, finding that the city could save twenty million dollars in construction costs alone by adopting the fixed bridge plan recommended by the study.[27]

Although the City Council did not implement the recommendations, the cost of maintaining and operating Chicago's older movable bridges remained a primary concern for the city. At Wells Street alone in 1946, the city paid annual salaries over $22,000 to bridge tenders, despite the decline in the number of openings per year over the previous decade.[28] In 1950, the city sought to cut operational costs associated with the movable bridges through a conversion to one-man operation. 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 consolidating the bridge controls. Nearly all the double-leaf bascule bridges built by the city had two operator's houses, each house controlling the operation of one leaf, an arrangement driven by technological factors as well as concerns for symmetry. At Wells Street Bridge, the superfluous operator's house stands as an inoperative symbol of an earlier level of technology and architectural vision.

Earlier architectural vision continues to define Chicago's riverfront. Several representatives of later architectural movements have added diversity to the Loop's movable

---

[26] Wells Street Bridge Maintenance Records and Wells Street Bridge Drawing Files, Chicago Department of Transportation, Bureau of Bridges and Transit.

[27] Hugh Young, Thomas Pihlfeldt, and Martin Oettershagen, "Waterway Developments, Barge Terminals and Bridge Clearances" unpublished, (Chicago, 1932) Municipal Reference Library of Chicago. 80.

[28] Like the other bridges on the main branch, the number of openings had dropped 40% from 1936 to 1947. Chicago Department of Public Works, *62nd Annual Report of the Chicago Department of Public Works* (1937), 316; and (1946), 280-281.

bridges, but the area is still dominated by bridges inspired by the *Chicago Plan*, such as the Wells Street Bridge. The earlier level of bridge technology has proven equally enduring. The conditions under which the city engineers developed the Chicago Type have changed dramatically since the era when the Chicago River was an important commercial waterway, but the basic early twentieth-century design serves new needs as Chicago enters the next century.

Sources Consulted

"Bridge Building Stops; No Money." *Herald Examiner* (30 March1921).

Chicago Department of Public Works, *Annual Report of the Chicago Department of Public Works.* (1918), 131

"Chicago Double-Deck Drawbridge with Elevated Railway" *Engineering News-Record* 88 (6 April 1922): 567-71.

"Handling Traffic on Chiacgo 'L' During Bridge Replacement" *Electric Railway Journal* 58 (24 December 1921):1113.

"L Depts for Bridges Unpaid." *Journal* (1 April 1921)

Pihlfeldt, Thomas G. "The Wells Street Bridge" *Journal of the Western Society of Engineers* 27 (February 1922): 59.

"Putting Large Bascule in Service." *Engineering-News-Record* 87 (13 October 1921): 606-7

Wells StreetBridge Drawing File, Chicago Department of Transportation, Bureau of Bridges and Transit.

Wilmann. "The Chicago Type of Bascule Bridge." *Engineering Record* 42, no 3 (21 July 1900): 50.

Willmann. "Trunnion Bascule Bridges with Fixed Counterweights" *Engineering & Contracting* 39, no. 16 (16 April 1913):426.