CHICAGO RIVER BASCULE BRIDGE, FRANKLIN STREET
I&M Canal National Heritage Corridor
North Franklin Street crossing the Chicago River
Chicago
Cook County
Illinois

HAER No. IL-65

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

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NOTE: Photographs taken by Jet Lowe, HAER photographer, 1987

IL-65-1 SOUTH PORTAL OF BRIDGE LOOKING EAST

IL-65-2 DETAIL OF SOUTH PORTAL

IL-65-3 DETAIL OF TRUSS AND PEDESTRIAN FOOTPATH LOOKING NORTHWEST

IL-65-4 NORTH PORTAL WITH BRIDGE TENDER'S HOUSE

IL-65-5 DETAIL OF LIFTING MECHANISM WITH BRIDGE TENDER'S HOUSE IN BACKGROUND

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HISTORIC AMERICAN ENGINEERING RECORD

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

HAER No. IL-65

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| Location: | I & M Canal National Heritage Corridor<br>North Franklin Street crossing the Chicago River<br>Chicago, Cook County, Illinois<br><br>UTM: 16 E.447250 N.4637250<br>Quad: Chicago Loop |
| Date of Construction: | 1920 |
| Builder: | Substructure, Great Lakes Dredge and Dock Company<br><br>Superstructure, Ketler and Elliot Company |
| Present Owner: | City of Chicago |
| Present Use: | Vehicular 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 Franklin Street Bridge was completed at the same time the City of Chicago was settling the patent dispute with Strauss. |
| 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. |

At the turn of the century, a Chicago Board of Consulting Engineers was formed to determine the best type of bridge to accommodate the heavy land and water traffic over the Chicago River. The trunnion bascule bridge, with its minimal moving parts, was chosen as the most efficient and practical design for the purpose. The development of the Chicago River bascule bridges was one of the most significant engineering achievements within the I & M Canal Corridor. In 1920 when the Chicago River improvements were renewed after the First World War, the Franklin Street bridge was erected. The Great Lakes Dredge and Dock Company of Chicago erected the substructure and the Ketler and Elliot Company, also of Chicago, erected the superstructure. The Franklin Street Bridge is virtually identical to the Monroe Street Bridge.

The Franklin Street Bridge is a single-deck, double-leaf, trunnion bascule bridge. The bridge measures 251'-10" from center to center of the trunnions and has a clear span of 220'-0". The superstructure is a steel pony truss with riveted gusset-plate connections. Width measures 62'-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) have an octagonal plan. There is a row of one-over-one-light, double-hung, sash windows beneath the denticulated cornice. There is a hipped roof of simulated tile (the material is tin); the crown has a shell motif. A concrete staircase gives access to the building from a parking deck just above water level.

**SOURCES:**

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

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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, FRANKLIN-ORLEANS STREET

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

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| Location: | Spanning the Chicago River at Franklin Street, Chicago, Cook County, Illinois. |
| | UTM: 16/447250/4637250 |
| | Quad: Chicago Loop |
| Date of Construction: | 1920 |
| Designer: | City of Chicago |
| Builder: | Great Lakes Dredge & Dock Co. (substructure); Ketler & Elliot Company (superstructure) |
| Present Owner: | City of Chicago. |
| Present Use: | Vehicular bridge. |

Significance: In 1906, engineers for the City of Chicago began to prepare for a new bascule bridge to link Franklin and Orleans Streets over the main branch of the Chicago River. Plans for the new bridge were modeled on a bridge under construction at North Avenue, a design similar to the first "Chicago type" bascule built by the city at Cortland Street in 1902. Fourteen years passed before the bridge at Franklin and Orleans opened for traffic in 1920. During the delay between proposals and construction, the practice of bridge building on the Chicago River had undergone significant development.

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**

In 1906, engineers for the City of Chicago began to prepare studies for a new bascule bridge to link Franklin and Orleans Streets over the main branch of the Chicago River. Plans for the new bridge were modeled on a bridge under construction at North Avenue, a design similar to the first "Chicago type" bascule built by the city at Cortland Street in 1902. Fourteen years passed before the bridge at Franklin and Orleans opened for traffic in 1920. During the delay between proposals and construction, the practice of bridge building on the Chicago River had undergone significant development. Not only had technological innovations introduced substantive changes in design, but the architectural treatment of the city's bridges reflected a new concern for the aesthetics of these visible public works. While the new architectural program had guided the design of bridges on the north and south branches of the river, an older generation of starkly utilitarian bridges still spanned the main branch. Completion of the Franklin-Orleans Bridge and Michigan Avenue Bridge in 1920 marked the first appearance of "aesthetically pleasing" bridges on the main branch of the river, the first step in a series of new public works projects that transformed the riverfront area that served as the gateway to the city.

**Bridge History**

At the turn of the century, the city faced considerable pressure from river traffic interests to replace the center pier swing bridges that impeded navigation on the Chicago River. Having studied the problem presented by the swing bridges, engineers from the city's Department of Public Works submitted a design for a "bascule" bridge, a term derived from the French word for teeter totter, that left a clear channel for river traffic. This original 1900 design consisted of two movable truss configured leaves that rotated on fixed axles, or trunnions. As the front portion of the span was balanced by weights rigidly attached to the rear, relatively little motive power was needed to raise or lower the leaves. This simple trunnion bascule design opened quickly and was well suited to the pliable soil of the Chicago substratum. The bridge became the basis for the widely known "Chicago-type" bascule bridge.

By 1906, the Bridge Division of the Department of Public Works had built several bascules, but complained that the available resources were inadequate even for the maintenance of existing bridges.[1] The U.S. Department of War, charged with safeguarding the navigability of the nation's waterways, exacerbated the problem by ordering the city to remove several swing bridges that were considered obstructions to navigation. To meet the demands of the War Department to replace existing bridges, plans for a new bridge at Franklin Street were postponed, and made contingent upon completion of a bascule at nearby Kinzie Street.

[1] Chicago Department of Public Works, *Annual Report of the Chicago Department of Public Works* (1905), 249; (1906), 267.

Other obstacles impeded the progress of work on the new bridge. The Chicago River split into its northern and southern branches where Franklin and Orleans streets met the river, and considerable river traffic vied for passage at this point. Commercial interests and the Army Corps of Engineers pressed for a substantial clear channel width to separate the abutments of the proposed bridge. While the city studied designs of various spans, the work was complicated by the need to co-ordinate the approaches of the Franklin and Orleans streets. Orleans Street, on the north side of the river, did not align with Franklin Street on the south bank, and was separated from the river by the tracks of the Chicago & Northwestern Railroad Company as they approached the Wells Street Station. As engineers studied the problem, it became clear that connecting Franklin and Orleans streets at the river would impact several other streets in the vicinity, including Kingsbury, Lake, Wells, and South Water Street, and require viaducts and regrading to make the approaches feasible. The question of grading also depended on what steps would be taken to tear down the buildings and market at South Water Street and build the bi-level roadway proposed by the Chicago Plan. This uncertainty as to the final location of the bridge halted work in 1914, but negotiations with property owners likely to be affected by the project continued.[2] Contracts were finally let for the bridge in 1917. Delays arising from labor strikes, material shortages due to World War I, and inclement weather slowed work on the bridge, which in a ceremony on 23 October 1920 attended by Mayor William "Big Bill" Thompson, was formally opened for traffic.

By 1920, the simple trunnion "Chicago-type" bascule was familiar to engineers of movable bridges across the country. In Seattle, Washington, city engineers borrowed the design and referred to their own bascules under construction in the 1920s as "Chicago-type" bridges. Yet two decades of development had significantly changed the Chicago-type of the 1920s from its earlier predecessors. Each movable leaf was supported by two pony trusses instead of three through trusses. In early designs, the bridge was raised by an electric-powered pinion that actuated an external rack in the curved upper chord of the truss end. Operating machinery in newer bridges consisted of a patented rack and pinion system mounted internally within the rear end of the leaf's two trusses, each driven by two separate electric motor and drive trains with the capacity to raise the leaf individually in the event of a failure of the other unit. Operation of the bridge was controlled from two operators' houses, one on each bank of the river. The Franklin-Orleans operators' houses were equipped with the "safety first" control devices recently introduced at the Monroe Street Bridge. These control boards had totally enclosed circuitry to

[2] Chicago Department of Public Works, (1914), 147.

avoid the dangers of the exposed copper connections of earlier models.[3]

The Franklin-Orleans Bridge as finally approved by the Army Corps of Engineers had the longest clear span between abutments of any bridge yet built by the City Bridge Division, and the loads on the trunnion bearings were correspondingly high. The engineers adjusted the bridge foundations accordingly, placing deep subpiers of reinforced concrete beneath the concrete piles used in older substructures. The basic structural supports for the trunnions followed a system developed by two of the Bridge Division's leading engineers, Alexander von Babo and Thomas Pihlfeldt, for several bridges built between 1908 and 1913. Supporting the trunnion bearings was a special concern, because the entire weight of the leaf concentrated on the two bearings as it opened and the supports had to allow space for a path of the large counterweight rigidly fixed to the rear end of the truss. The design relied on several large girders to carry the loads to the concrete counterweight pit. Along both sides 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 superstructure was configured such that the cross girder passed through the movable truss, allowing a broad range of nearly eighty degrees rotation. This arrangement permitted use of a larger counterweight built of concrete, a much cheaper material than the cast iron or scrap iron that had was needed for smaller counterweights.

This 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 named several of the city's bridges in the lawsuit, claiming the cross girder design infringed on an earlier Strauss patent.[4] Despite warnings by Strauss as early as 1911, the city's bridge engineers continued to use the cross girder design in several bridges built during the lengthy period of litigation, including the Franklin-Orleans bridge. This suggests that the city may have 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

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

[4] *City of Chicago v Strauss Bascule Bridge Co.*, 2677 US Circuit Court of Appeals, 7th Circuit, 3 (1918)

(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.[5]
At the same time engineers were developing a second generation Chicago type, the appearance of the city's bridges also 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 visible 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 and influence. The work of Burnham and his assistant Bennett, both prominent Chicago architects, had been sponsored by the Commercial Club of Chicago to guide the future development of the city. Chairman of the Chicago Plan Commission Charles H. Wacker explained that the central idea of 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 expenditures for public improvements from year to year may serve not only the purpose of the moment, but also the needs of the future."[6] 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.

The changing attitudes toward the appearance of the city's bridges could be seen in the contrast between the original 1906 design of the Franklin-Orleans Bridge and its design as built in 1920. The 1906 architectural layout of the Franklin-Orleans Bridge was typical of bridges built prior to the Chicago Plan. Little attention was paid to the appearance of the bridge,

[5] Ultimately, the city's claim that the cross girder design was anticipated by earlier engineers was upheld in another patent infringement suit brought 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 weigh 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 handed 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. Although the argument secured victory for the Seattle defense team, there is no evidence that the result in the Chicago case was changed in any way.

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

particularly in regard to the operators' houses, which were 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. Their campaign for bridges of "an improved appearance" was aided by the addition of other advocates such as the Municipal Art League, the Art Commission of the City of Chicago, and the Municipal Art Committee of the Illinois Chapter of the American Institute of Architects (AIA) to the cause. By 1920, the CPC and the AIA had drafted the architectural design for several of the city's bridges, including the new Franklin-Orleans Bridge.

As mentioned in an earlier Historic American Engineering Record documentation project that precedes this addendum, the bridge's architectural treatment closely resembles a bridge completed in 1919 at Monroe Street, although the Franklin-Orleans location was not constrained by the same space limitations that unbalanced the symmetry of the Monroe design. Its octagonal,granite and terra cotta-clad, tile-roofed operators' houses were typical of several bridges built from 1916 to 1922, including those at Webster, Belmont, Monroe, and Wells streets. The *Annual Report of the Department of Public Works* attributed this design to a collaboration between architects of the CPC and AIA, supervised by Edward Bennett and George W. Maher respectively.[7] It is difficult to ascertain whose influence weighed more heavily on the design, but a 1916 architectural rendering of the Franklin-Orleans bridge that presaged later designs made by Bennett for the LaSalle and Clark Street bridges was rejected in favor of one that better harmonized with the nearby Wells Street bridge being planned at that time, suggesting that Maher likely had a significant role in the final design.

**"A much needed direct connection"**

The ceremony that officially dedicated the Franklin-Orleans Bridge attracted a sizable crowd and coverage by several newspapers. Among the attendees were representatives of the various groups that had pressed for a new bridge at this location. Mayor William H. Thompson, invariably looking to bolster his image as "Big Bill the Builder," cut the ribbon to symbolically

[7] Chicago Department of Public Works, (1916), 171.

open the bridge for traffic. Thompson was an enthusiastic booster of bridge building, and lent critical support to the city agency that handled public works funded by assessment, the Board of Local Improvements (BLI). Empowered to assess property owners for public improvements such as sidewalks, street paving, and street widening projects, the Board of Local Improvements often worked closely with the Chicago Plan Commission to improve the city's infrastructure. The politics of public works could be tricky business, as commercial interests adversely affected by improvement projects could potentially become powerful enemies. BLI President Michael Faherty complained that until Thompson was elected in 1915, no mayor had ever attempted to help the CPC, for they feared assessing, and thereby antagonizing, property owners to make improvements.[8]

Although the street widening projects such as the massive Michigan Boulevard improvement that moved forward during Thompson's tenure engendered considerable opposition and lawsuits, certain business interests could also be counted on as important allies. Some of the foremost proponents of the new bridges were local associations formed by businessmen that stood to benefit from their construction. At the opening ceremony, the Chicago City Council commended one such organization, the Franklin-Orleans Bridge Association, "which had worked for nearly ten years to bring about construction of the bridge."[9] The *Daily News* reported that business men in the vicinity of the bridge had looked forward to this day for years, as the bridge would provide a much needed direct connection between the Loop and the warehouse and business district of the near northwest side.[10]

Organizations associated with the burgeoning automobile movement added their voices to the clamor for new bridges. Between 1910 and 1920, the meteoric rise in the number of automobiles and trucks in the city had generated a heightened concern for improving vehicular traffic and opening new arteries to the Loop. Newspapers reported that many of the hundreds of

[8] A.E. Burnett, *A Sixteen Year Record of Achievement, 1915-1931* (Chicago: Buckley, Dement & Co., 1931), x.

[9] *Chicago Tribune* (24 October 1920).

[10] *Chicago Daily News* (23 October 1920).

decorated cars that participated in a parade that preceded the Franklin-Orleans dedication were members of the Chicago Automobile Trade Association. Over a thousand trucks said to represent "nearly every large truck user in the city also participated in the parade, whose theme was appropriately "Ship by Truck."[11] "Ship by Truck" referred to a national campaign founded by tire manufacturer H.S. Firestone to promote trucking freight, thereby increasing both the numbers of trucks on the road and ostensibly the demand for his tires. For his role in supporting the Franklin-Orleans project, the parade organizers named James G. Barber, head of the local "Ship by Truck" bureau, grand marshal.[12] Between commercial truckers, automobile clubs, and automobile enthusiasts, the automotive interest groups comprised an influential body of new bridge advocates.

**Epilogue**

If the dawning of the automobile age added weight to the city's campaign to improve its transportation infrastructure, the additional wear caused by the heavy trucks and cars quickly revealed the inadequacies of existing roadway materials. Just seven years after its official opening, the city had to redeck the Franklin-Orleans Bridge with asphalt-covered timber planking, and eventually switched from a timber supported roadway to steel grids filled with concrete in 1951. The bridge also underwent three major rehabilitations of steel framing, structural supports, and truss members in 1940, 1971, and 1992.

In the early 1930s, inspectors also uncovered a disturbing development on the northwest side of the bridge. The expansion joint between the viaduct and the bridge approach had been inadequate, loosening the masonry that enclosed the machinery and supported the northwest approach. When repair of the masonry began in 1936, workers removed four terra cotta pylons near the operator's houses at the same time. The pylons 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, 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

[11] *Chicago Tribune.*

[12] *Chicago Post* (22 October 1920).

fifteen years of service, the "cracked and dangerous condition" of the masonry sentries resulted in their replacement with less decorative but more up to date and practical signal equipment.

Other changes pertained to the operation of the bridge. Until 1950, most of the double-leaf bascule bridges built by the city had two operator's houses, each house controlling one leaf. This arrangement was driven by technological factors as well as an aesthetic concern for symmetry. After 1950, the city sought to cut operational costs associated with the movable bridges through a conversion to one-man operation. At Franklin-Orleans alone in 1946, the city paid annual salaries over $22,000 to bridge tenders. In addition, since 1937, the number of openings per year had declined nearly 40%.[13] In 1952 the city discontinued 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. Clearly the decline of the Chicago River as a major point of entry for commerce precipitated some of the operational changes, a development welcomed by motorists who had long protested the delays and traffic jams caused by frequent bridge openings. The city completed the conversion of the Franklin-Orleans Bridge to one-man operation in 1958. Now superfluous, the northern operator's house stands as an inoperative symbol of an earlier level of technology and architectural vision.

[13] Chicago Department of Public Works, (1937), 316; and (1946), 280-281.

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