EXHIBIT A

LANDMARK DESIGNATION REPORT

Historic Chicago Railroad Bridges

St. Charles Air Line Bridge, located near 16th and Lumber Sts.
Lake Shore & Michigan Southern Railroad Bridges (Pair), located near the Skyway & 98th St.
Chicago & Western Indiana Railroad Bridge, located near 126th St. & Torrence Av.
Chicago & Alton Railroad Bridge, located near Ashland and Archer Av.
Illinois Central Railroad Swing Bridge, located near the Stevenson Exp. and Kedzie Av.

Pennsylvania Railroad "Eight Track" Bridge, located near 31st St. and Western Av.
Chicago & Illinois Western Railroad Bridge, located near 33rd St. and Kedzie Av.

Illinois Central Railroad Swing Bridge, located near 35th St., between Pulaski & Lawndale Av.
Pennsylvania Railroad Bridge, located near 19th and Lumber Sts.
Chicago, Milwaukee & St. Paul Bridge, located near Cherry St. and North Av.
Chicago & Northwestern Railroad Bridge, located near Kinzie and Canal St.

Preliminary Landmark recommendation approved by the Commission on Chicago Landmarks, September 7, 2006

CITY OF CHICAGO
Richard M. Daley, Mayor

Department of Planning and Development
Arnold L. Randall, Acting Commissioner

Cover (clockwise from top left): the Pennsylvania Railroad "Eight Track" Bridge located near 31st Street and Western Avenue, the Pennsylvania Railroad Bridge located near 19th and Lumber Streets, the Illinois Central Railroad Swing Bridge located near the Stevenson Expressway and Kedzie Avenue, and the Chicago and Alton Railroad Bridge located near Ashland and Archer Avenues (all photos courtesy of the Historic American Engineering Record).

The Commission on Chicago Landmarks, whose nine members are appointed by the Mayor and City Council, was established in 1968 by city ordinance. It is responsible for recommending to the City Council which individual buildings, sites, objects, entire or districts should be designated as Chicago Landmarks, which protects them by law. The Commission is staffed by the Chicago Department of Planning and Development, 33 N. LaSalle St., Room 1600, Chicago, Illinois 60602; (312-744-3200) phone; (312-744-2958) TTY; (312-744-9140) fax; web site, http:www.cityofchicago.org/landmarks.

The landmark designation process begins with a staff study and a preliminary summary of information related to the potential designation criteria. The next step is a preliminary vote by the landmarks commission as to whether the proposed landmark is worthy of consideration. This vote not only initiates the formal designation process, but it places the review of city permits for the property under the jurisdiction of the Commission until a final landmark recommendation is acted on by the City Council.

This Landmark Designation Report is subject to possible revision and amendment during the designation process. Only language contained within the designation ordinance adopted by the City Council should be regarded as final.

Historic Chicago Railroad Bridges

Period of Significance: 1898-1968

(Map on p. 3)

1. Illinois Central Railroad Swing Bridge
North of 35th St., between Pulaski and Lawndale Av.
Chicago Sanitary & Ship Canal
Date: 1898-1900
Designer: Sanitary District of Chicago

2. Illinois Central Railroad Swing Bridge
North of Stevenson Expy., East of Kedzie Av.
Chicago Sanitary & Ship Canal
Date: c. 1890-1899
Designer: Sanitary District of Chicago

3. Chicago, Milwaukee & St. Paul Railway Bridge No. Z-2
North Cherry St., Immediately South of North Av.
North Branch of the Chicago River
Date: 1901-1902
Designer: Chicago, Milwaukee & St. Paul Railway

4. Pennsylvania Railroad Bridge
South of 19th St., East of Lumber St.
South Branch of the Chicago River
Date: 1914
Designer: Waddell & Harrington, Consulting Engineers

5. Chicago & Alton Railway Bridge
East of Ashland Av., North of Archer Av.
South Fork of the South Branch of the Chicago River
Date: 1906
Designer: Page & Shnable, Patentee

6. Chicago & Northwestern Railway Bridge
South of Kinzie St., East of Canal St.
North Branch of the Chicago River
Date: 1907-1908
Designer: Strauss Bascule & Concrete Bridge Co.

7. Pennsylvania Railroad "Eight-Track" Bridge
South of 31st St., West of Western Av.
Chicago Sanitary & Ship Canal
Date: 1901, 1909-1910
Designer: Scherzer Rolling Lift Bridge Company

8. Chicago & Illinois Western Railway Bridge
33rd St., East of Kedzie Av.
Slip of the Chicago Sanitary & Ship Canal
Date: 1914
Designer: Theodor Rall

9 & 10. Lake Shore & Michigan Southern Railway Bridges (Pair)
East of the Chicago Skyway, North of 98th St.
Calumet River
Date: 1912-1915
Designer: Waddell & Harrington

11. St. Charles Air Line Bridge
North of 16th St., East of Lumber St.
South Branch of the Chicago River
Date: 1917-1919; relocated in 1930
Designer: Strauss Bascule & Concrete Bridge Co.

12. Chicago & Western Indiana Railroad Bridge
North of 126th St., East of Torrence Av.
Calumet River
Date: 1967-1968
Designer: James Peterson, Chief Engineer

A distinctive aspect of Chicago's skyline, the city's historic railroad bridges represent an integral part of the city's industrial and commercial history. Since the first railroad tracks were laid in 1848, Chicago gained the reputation as a commercial giant credited with fueling westward expansion via the rails. Quickly the city became the nation's railroad hub with a vast network of tracks responsible for transporting goods and passengers throughout the United States.

Chicago's railroads greatly impacted the city's landscape. Factories, warehouses, and stockyards all clustered in and near Chicago during the second half of the nineteenth century to be in close proximity to the rail lines, depots, and train yards that emerged in the city. Massive, moveable bridges exclusively dedicated to railroad traffic spanned the city's waterways to facilitate the smooth transit of freight and passengers. Today the Historic Chicago Railroad Bridges are among the most visible expressions of the historical importance of the railroads to the economic development and growth of the city.

The Historic Chicago Railroad Bridges identified in this report represent some of the best-surviving examples of rare and innovative moveable bridge designs in the city. In them you can see the structural engineer's design creativity and intent to meet the transportation needs of a rapidly-growing city. These structures show the innovations in and evolution of bridge technology and design that thrust Chicago into the forefront of the field of moveable bridge design on both a national and international scale. The bridges proposed for designation are some of the most intact and singular examples due to their age and type

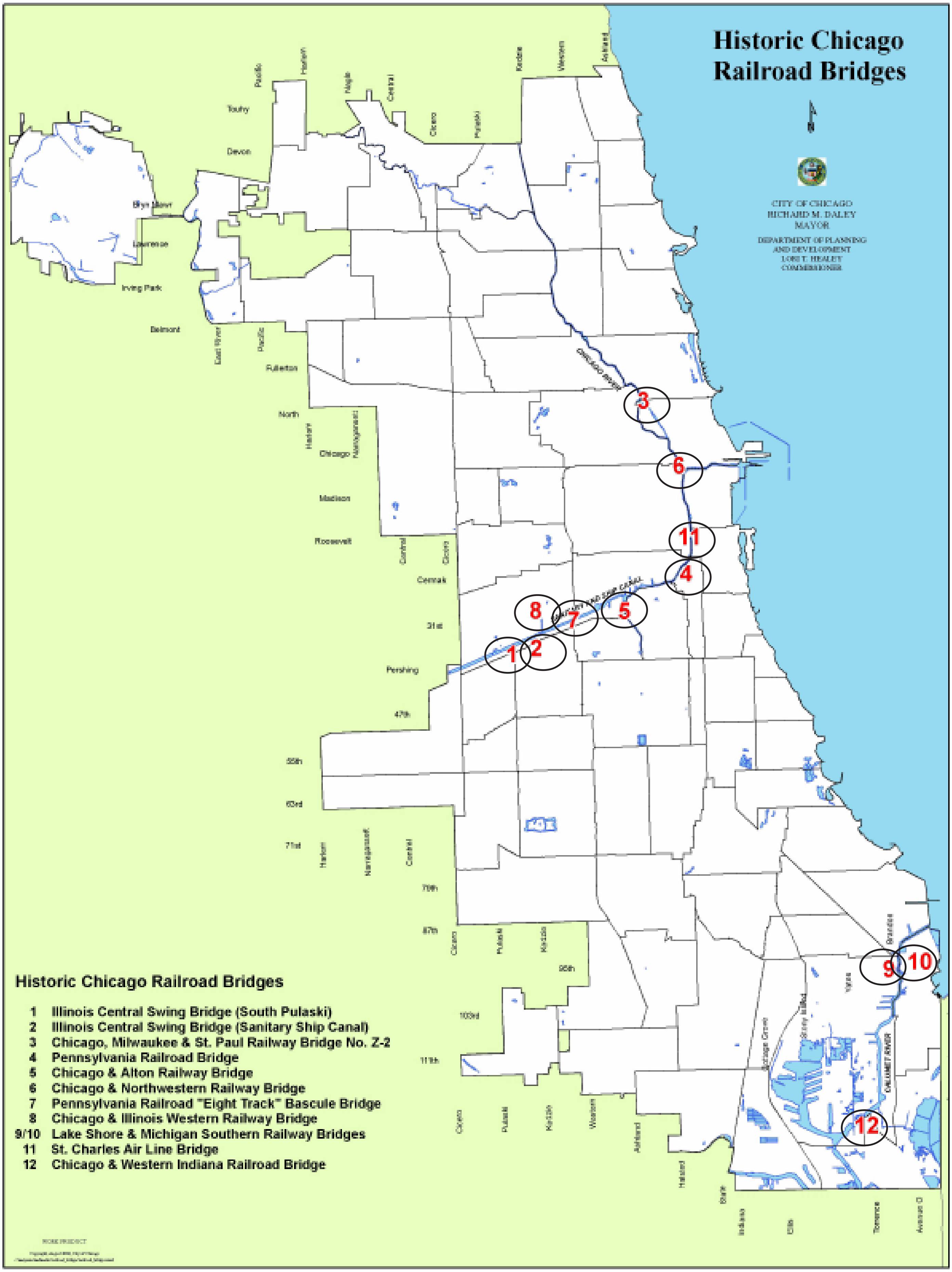
The Importance of Railroads to Industry and Commerce in Chicago

In 1836, two occurrences spurred the growth of the city—the construction on the 97-mile Illinois & Michigan (I&M) Canal and the chartering of the Galena & Chicago Union Railroad. Completed in 1848, the I&M Canal linked the Chicago River to the Illinois River at LaSalle, Illinois. The promise of inexpensive transcontinental water access from Lake Michigan brought hoards of businessmen and land speculators to Chicago to establish operations and purchase land along the canal route.

While the I&M Canal demonstrated its importance to Chicago commerce, the pivotal and interconnected role of the railroads also began to emerge. There was not a single mile of railroad track in Chicago until 1848. However, in just ten years time, the city would become the rail capital of the United States, and the importance of the Canal would be eclipsed. William B. Ogden (1805-77), Chicago's first mayor, together with a small group of investors, bought the rights to the Galena and Chicago Union Railroad (G&CU) in 1846. Due to a lack of funding, the G&CU did not begin laying its first tracks until 1848. The railway line originated on the corner of Kinzie and Halsted Streets, which was, at that time, just outside of the city limits, and terminated in Oak Ridge (now Oak Park).

The steam engine *Pioneer* made its first trip down the G&CU's eight-mile-long-track in 1848. On its return trip, the engine hauled a load of grain back into the city. When the train returned to the countryside the following week, there were thirty loads of grain waiting to be hauled back to Chicago. In the years that followed, the railway, which was initially banned from the heart of the city, constructed an engine house on the North Branch of the Chicago River and a depot on North Water Street, along with a drawbridge across the river.

The "Annual Review of Commerce" published by the *Chicago Tribune* in 1850 announced, "The three great avenues of Chicago's commerce abroad are the Lakes, the Illinois & Michigan Canal, and the Galena and Chicago Union Railroad." By 1852, just four years after its first run, the Galena would carry over half the wheat that arrived into the city. The success of Ogden's railroad convinced originally skeptical investors that railroads in Illinois could be enormously profitable.


Historic Chicago Railroad Bridges
CITY OF CHICAGO
RICHARD M. DALEY
MAYOR
DEPARTMENT OF PLANNING AND DEVELOPMENT
LORI T. HEALEY
COMMISSIONER
Touhy
Devon
Bryn Mawr
Lawrence
Irving Park
Belmont
Fullerton
North
Chicago
Madison
Roosevelt
Cermak
31st
Pershing
47th
55th
63rd
71st
79th
87th
95th
103rd
111th
Pacific
Harlem
Nagle
Central
Cicero
Pulaski
Kedzie
Western
Ashland
East River
Narragansett
Halsted
Indiana
Ellis
Torrence
Avenue O
Stony Island
Cottage Grove
Yates
Brandon
CHICAGO RIVER
SANITARY AND SHIP CANAL
CALUMET RIVER
1
2
3
4
5
6
7
8
9
10
11
12
Historic Chicago Railroad Bridges
1 Illinois Central Swing Bridge (South Pulaski)
2 Illinois Central Swing Bridge (Sanitary Ship Canal)
3 Chicago, Milwaukee & St. Paul Railway Bridge No. Z-2
4 Pennsylvania Railroad Bridge
5 Chicago & Alton Railway Bridge
6 Chicago & Northwestern Railway Bridge
7 Pennsylvania Railroad "Eight Track" Bascule Bridge
8 Chicago & Illinois Western Railway Bridge
9/10 Lake Shore & Michigan Southern Railway Bridges
11 St. Charles Air Line Bridge
12 Chicago & Western Indiana Railroad Bridge

The first railroad from the eastern United States reached Chicago by 1852, and with that the railroad boom in Chicago was on. In the year that followed, four more railroads laid tracks in the city. Soon, long distance lines radiating from Chicago to the East and to the expanding western territory established the city as a major player in the national economy. In 1856, the number of railroads in Chicago again doubled. On a daily basis fifty-eight passenger trains and thirty-eight freight trains rolled into the city everyday. By 1857, over 3,000 miles of railroad track led to Chicago, making it the center of the largest railway network in the world at that time. As the railroads grew, so did the city. In 1850, Chicago's population totaled 30,000; by 1860 that number had more than tripled.

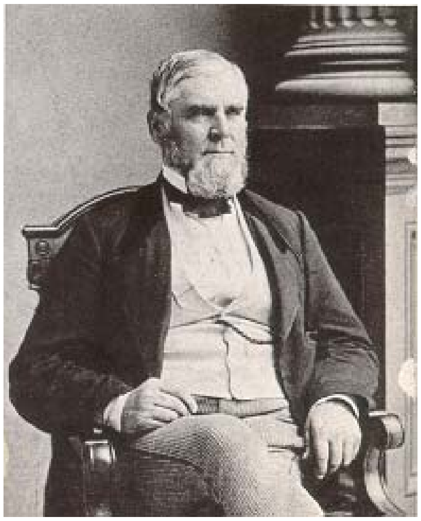
Throughout the century that followed, Chicago's interconnected river and rail network shaped the city's landscape and fueled its commercial and industrial growth. By enabling rail and water transportation to circulate through the city with relatively little interference, moveable railroad bridges played a pivotal role in making Chicago's river and rail network more efficient than any other in the United States. Industrial development along the Chicago River began in earnest and grew exponentially by the end of the nineteenth century. As an important port for maritime traffic as well as the crossroads of railroad routes, Chicago's location gave the merchants and manufacturers who established operations along the river a great advantage.

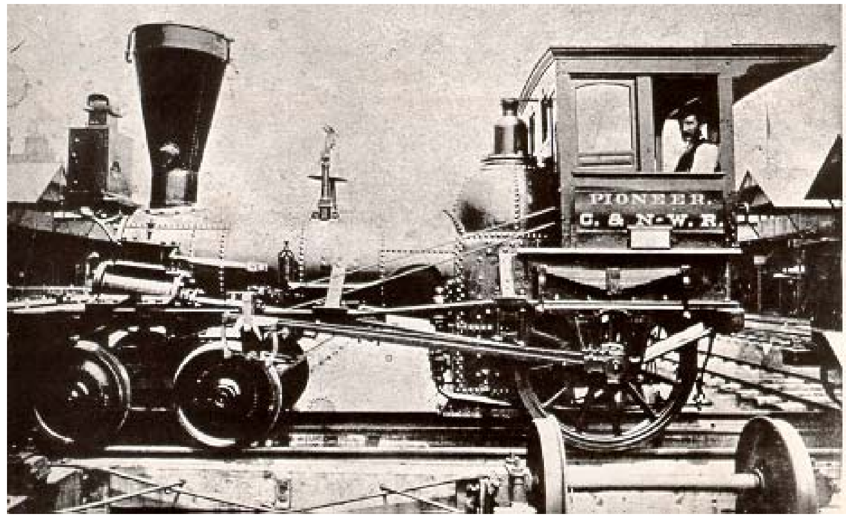
Factories, warehouses, lumber yards, and stock yards all clustered in and near Chicago during the second-half of the nineteenth century, making the city a manufacturing and wholesale center for the United States. These industrial and commercial enterprises initially tended to be located near the easy transportation of both water and rail. The Chicago River, including both the North and South Branches, soon became an important nexus for such commerce as railroad lines and spurs spread out along the river's banks, connecting docks and riverside factories and warehouses with the country's ever-growing railroad network. Raw materials were brought into the city by either water or rail, transformed into finished goods through manufacturing, then shipped by rail and water to consumers.

Photographs from the 1860s through 1900 show the intensely commercial uses of the Chicago River. The river was full of ships, passing by industrial buildings of varying sizes and complexity. Raw materials of all sorts were brought to warehouses and storage yards along the river, including lumber, metal ores, and grain. Near the Lake Michigan shore, enormous warehouses to store grain were built on the south bank of the river. On the north bank of the river, east of today's North Michigan Avenue, stood Cyrus McCormick's reaper factory where iron ore was shaped into mass-produced farm equipment.

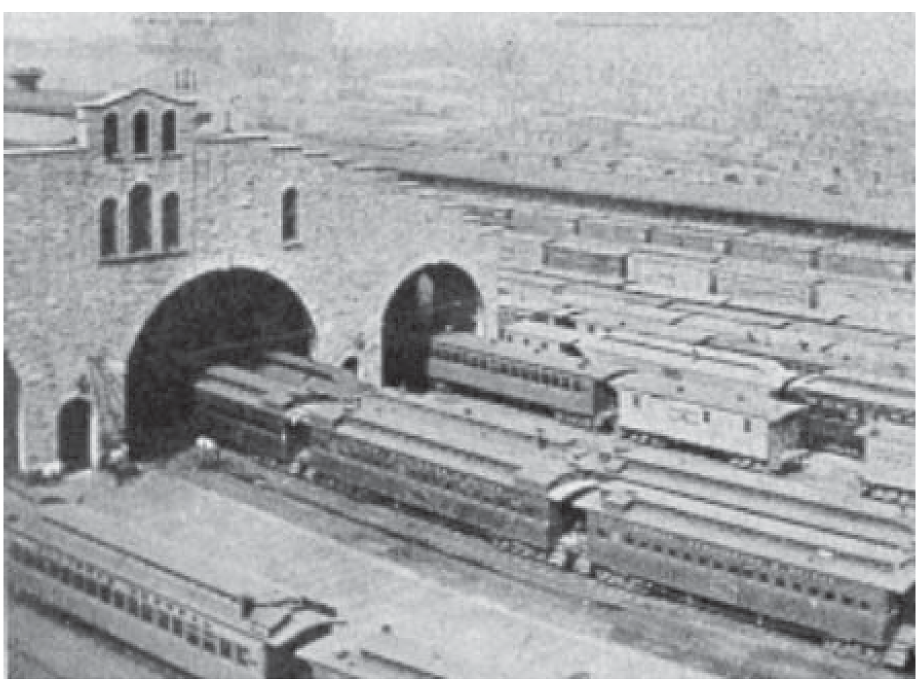
Even though the city and the river grew together, and made each other great, a tension existed between them. While the river brought business and industry to the city, its Y-shape with branches running north and south often made land traffic a challenge. Moveable railroad bridges eased this tension by facilitating the transportation of raw materials into the city while allowing for an uninterrupted stream of manufactured goods to be shipped out west. Especially important to the development of industrial and manufacturing operations along the Chicago River, and later along the Calumet River and the Sanitary and Ship Canal, railroad bridges helped to transform Chicago from a bustling port into the central depot and distribution center for the United States almost overnight.

At the close of the nineteenth century and early in the first decades of the twentieth century, major feats of civil engineering, including the reversal of the flow of the Chicago River and the straightening of the river, greatly underscored the importance of railroad bridges to the city's interconnected river and rail network. In order to improve the sewage system of Chicago, a plan was developed in 1892 to reverse the flow of the





The first mayor of Chicago, William B. Ogden (top left) was instrumental in establishing the first railroad to serve the city, the Galena and Chicago Union Railroad (G&CU). The steam engine *Pioneer* (top right) made its first trip down G&CU's eight-mile track in 1848. Chicago's first railroad depot (left) was located outside of the city limits.

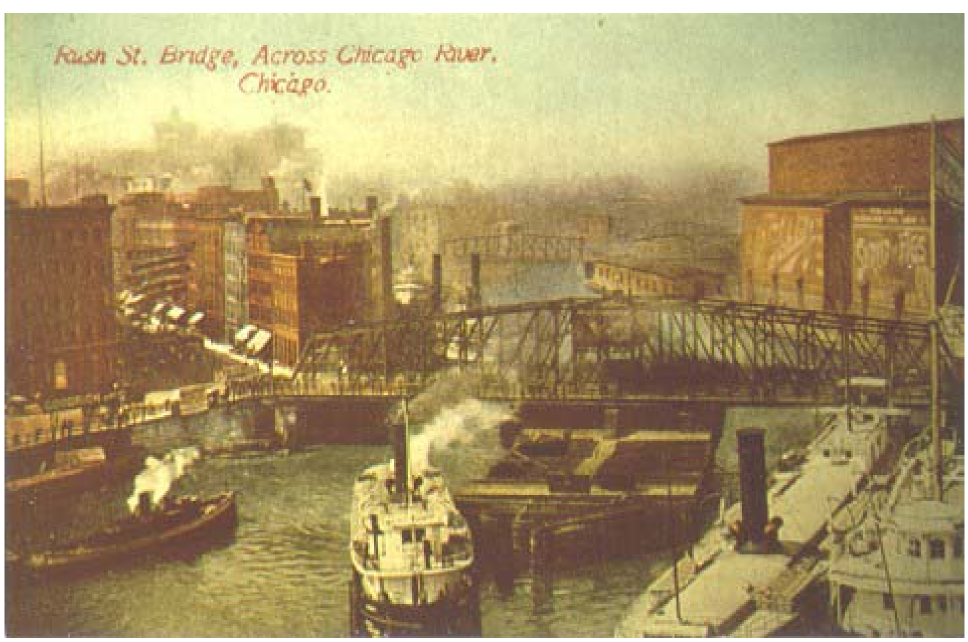


By the 1860s, the city's landscape changed dramatically to accommodate rail traffic in the city. The Illinois Central Terminal Complex (bottom left), seen here in the mid-1860s, was located near the corner of Michigan Av. and Randolph St.

While the Chicago River played a critical role in the early economic development of the city, it also presented challenges. The Dearborn St. Drawbridge, the city's first bridge (above), was constructed in 1834. The bridge impeded both ship and land traffic and was quickly demolished.

By the 1850s, lake, canal and rail traffic had increased on the Chicago River (middle).

Innovative bridge designs were sought to ease the growing tension between land and water traffic. Swing-span bridges (middle and bottom) were introduced along the river after the repeated failures of the early bridge types.



river by building a 28-mile canal, known as the Sanitary and Ship Canal. Construction of the canal, extending from the South Branch of the Chicago River to Lockport (a far south suburb), was completed in 1900.

Due to increases in population, another artificial waterway to dispose of waste waters was created in Chicago in 1922. This river, known as the Cal-Sag channel, extended 16 miles westward from the Little Calumet River to a junction with the Sanitary and Ship Canal. In all, the entire sanitary system would consist of 71 miles of canals, channels, and rivers. Four of the Historic Chicago Railroad Bridges, identified in this report including **Bridge 1** (constructed in 1898-1900), **Bridge 2** (1899-1900), **Bridge 7** (1901; 1909-10), and **Bridge 8** (1914), are located along the Sanitary and Ship Canal. Together this ensemble of bridges, which includes two of the earliest surviving swing-span bridges and two innovative bascule bridges, demonstrates the evolution of bridge design at the turn of the twentieth century.

In 1928, the straightening of the south branch of the Chicago River between Polk and 18th Streets was initiated. The project involved removing the bend from the river and digging a new channel about 850 feet west of Clark Street. For years the normal expansion of the city's central business district to the south had been prevented by the river bend. The resulting improvement enabled the railroads to construct terminals more suitable to their needs and opened new through streets from the Loop. The project was completed in 1930 when the old river channel was filled in. As a result of this project, the St. Charles Airline Bridge, referred to as **Bridge 11** (1917-19) in this report, was shortened and relocated to its current location in 1930.

The Evolution of Bridges in Chicago

Bridge design in Chicago was an evolutionary process that began in 1831 with the construction of the city's first bridge—a span that was privately funded for the purpose of providing citizens a means of crossing the north branch of the river to patronize a tavern on the east bank. It quickly became obvious that stationary bridges which did not have adequate clearance for ships to pass below would not serve the needs of the growing city. Since that time, the history of bridge building in Chicago has been affected by engineering technology, the growth and decline of shipping in the city, and the input of various government agencies.

Moveable bridges became a necessity as larger, masted vessels were used to transport larger quantities of goods from the shores of Lake Michigan down river. In 1834, Chicago's first moveable bridge was constructed at Dearborn Street. Primitive in design, this double-leaf drawbridge spanned 60 feet and manually opened with the use of chains. A menace to river navigation, the drawbridge was once stuck open for two days. It was demolished in 1839.

Throughout the 1840s and 50s, Chicago used the pontoon bridge design for river crossings at Clark, Wells, Randolph and Kinzie Streets. This bridge type was popular in Chicago primarily because it was made from wood (an extremely abundant material at the time) and was simple to build and maintain. Pontoon bridges came in two styles: the raft and the pile styles.

The raft style was a moveable floating bridge built to span the river. If a vessel needed to pass, the bridge was pulled out of the way by a person on shore assisted by the use of ropes and a capstan. The pile style, albeit ideal for railroad use, was often built without navigational interests in mind. It was a fixed bridge designed to support the weights of the engine and railroad cars. A series of logs or "piles" were driven into the river bed creating a support system on which a plank road rested on top of the piles. Tracks were then applied to the plank road allowing the train to cross.

Despite the pontoon bridge's simplicity, it often encountered problems during seasonal spring thaws when ice dams would often carry off entire bridges downstream. A catastrophic flood in the spring of 1849 loosened an ice dam that swept all the bridges down river, along with a number of vessels. The pontoon-style bridges were rebuilt within the year and, despite their problems, the G&CU used the design to build its first railroad bridge at Kinzie Street in 1852, but no historic photos exist showing which style was used. No examples of this bridge type survive.

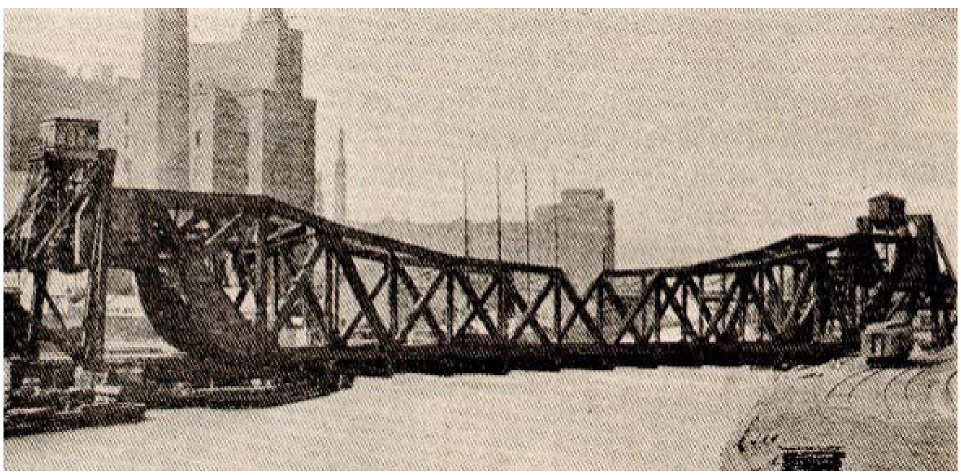
The powerful maritime interests, not satisfied with the quick-fix of the city's bridges, demanded that the bridges be anchored and forced the city to redesign its bridges. The result was a swing bridge, the first built at Rush Street in 1857. Built at a cost of $48,000, Chicago's Rush Street Bridge was made of iron and timber, and rotated on rollers and a track with a central pier permanently located in the waterway. The bridge also had long wooden platforms constructed on pylons from which the operator could manually open the bridge. When fully opened, the bridge ran parallel with the waterway, creating a clear channel on either side of the pier. Gradually, each pontoon bridge was replaced with the newer swing bridge. Longer boats in particular had difficulty navigating around the pier and platform at tight bends in the Chicago River, so collisions were frequent.

Designing an efficient and somewhat aesthetically pleasing movable bridge was a challenge for designers and engineers. Chicago however was on the cutting edge of bascule (a French term for "seesaw" and "balance") bridge design in the 1890s, as engineers developed and patented several important types of moveable bridges. In 1893, William Scherzer patented a bridge design that showed much promise. It was a "rolling lift" bridge, a two-leafed bridge that worked like facing rocking chairs that rocked back away from each other, leaving a clear space between. This early movable bridge was the first of two types of bascule bridges to be erected in Chicago, and it was an important predecessor to the "Chicago-type" trunnion bascule bridges that today are a familiar sight along the Chicago River and around the world. Bascule bridges represented a great improvement over the older swing bridges. They operated efficiently, allowed for a clearly navigable waterway, and they could be built in close proximity to each other since their spans generally swung vertically rather than horizontally.

In 1897, the U.S. Army Corps of Engineers surveyed the river and highlighted Chicago's numerous swing bridges as navigational obstacles. The increasing role of the federal government in Chicago River navigation resulted in the River and Harbor Act of 1899, which gave the U.S. Secretary of War the authority to order the bridges removed. In the following decade, nearly all the vehicular and railroad swing bridges were replaced with the bascule bridge type. The Illinois Central Railroad Bridges, identified as **Bridge 1** (1898-1900) and **Bridge 2** (1899-1900) in the following catalog, represent two of the best-surviving examples of the swing bridge, this rare early bridge type.

Railroad Bridge Typology

The tradition of bridge building in Chicago is a rich one. Chicago entered into an experimental phase in bridge design in the 1890s, spurred by complaints from the marine interests about the swing-span type and the navigational obstacles it posed. In the decade that followed, the city became recognized as the nation's center for the study and exploration of moveable bridge design. In 1894, the first vertical-lift bridge was erected for vehicular use at Halsted Street from a design by Kansas City engineer, **John Alexander Low**



The city's first swing-span bridge (left), was constructed in 1857 over the Chicago River at Rush Street.

During the late-1890s, Chicago emerged as the nation's center for the study of moveable bridge design. Two important moveable bridge types introduced in Chicago were the rolling bascule bridge at Van Buren St. designed by William Scherzer (middle) and the vertical-lift bridge at Halsted St. developed by J.A.L. Waddell (bottom).

Waddell (1854-1938), while a rolling-lift design by engineer, **William Scherzer (1858-1893),** was erected for rail use at Van Buren Street that same year.

William Scherzer completed the design of the Van Buren Street Bridge in 1893 and died that same year. The innovative design was patented five months after his untimely death. Scherzer, a native of Switzerland who would become so closely associated with the development of moveable bridges in Chicago, never saw his design executed and never knew that his rolling bascule represented an unparalleled advance in the evolution of moveable bridges. Following William Scherzer's death, his brother **Albert H. Scherzer** established the Scherzer Rolling Lift Bridge Company to develop and construct bridges based on William Scherzer's designs. These designs proved to be important precussors to gererations of the "Chicago-type" trunnion bascule bridges that would evolve in the city.

The influential, innovative moveable bridge designs patented by Waddell and Scherzer demonstrated the potential advances in transportation that moveable bridges could provide. As a result, Chicago emerged as a great incubator for bridge technology—producing important Chicago civil engineers **Joseph Baermann Strauss (1870-1938)** and **John W. Page (1868-1967)** and attracting other innovative bridge designers from around the nation who developed and patented some of the bridge designs discussed in this report.

Railroads frequently chose to use patented bridge designs. In most cases, the patents were still under the control of the designing engineer, and royalties were collected for their use. The Strauss bascule and Waddell & Harrington vertical-lift bridges were extremely popular patented designs among the various railroad companies entering in Chicago, due to their proven reliability.

The design and construction of innovative bridges in Chicago by prominent designers, and later by the City of Chicago's Division of Bridges and Viaducts, placed Chicago on the cutting edge of moveable bridge design. By 1900, Chicago developed its own type of trunnion bascule bridge, based on the principals of William Scherzer's design, which would later become the international model for vehicular bridges and structures spanning navigable waterways. In an article by renown bridge designer Joseph Strauss, entitled "The Bascule Bridge in Chicago," Strauss describes Chicago as, "the acknowledged bascule center of the world; it is here that this type of moveable bridges has reached its greatest development."

Important bridge types represented by the Historic Chicago Railroad Bridges are:

Swing-span Bridge

The swing bridge type was introduced in Chicago in the mid-19th century after the repeated failures of the pontoon bridge type. The typical swing-span bridge was comprised of a single steel truss in which, when opened, the entire weight of the bridge is carried on a central pier permanently located mid-channel. The pier was capped with a metal turntable rotated on rollers and a track. Early versions of the swing-span type had long wooden platforms constructed on piles from which the operator could manually open the bridge for navigational passage. The wooden platforms were eventually eliminated when electric or gas-powered motors were introduced in the late-19th century. **Bridges 1 and 2** contained in this report are examples of this early bridge type, constructed in 1898-1900 and 1899-1900, respectively.

The design and construction of innovative bridges in Chicago by prominent designers put Chicago on the cutting edge of moveable bridge design. J.A.L. Waddell (top center) and John Harrington (top right) collaborated to design acclaimed vertical-lift bridges. One of their designs, the Pennsylvania Railroad Bridge (listed at Bridge 4 in this report) is shown in the late 1910s (left).

William Scherzer's rolling lift bridge at Van Buren St. (left) represented an unparalleled advance in the design of moveable bridges. The design of other bascule bridges, based on the principals of Scherzer's design, included the Strauss Bascule Bridge by Joseph Strauss (bottom left). Strauss' bridge for the Chicago & Northwestern Railway (listed as Bridge 6 in this report) is seen below in 1908.

Vertical-lift Bridges

The bridge operates on the same principles as an elevator, in which the bridge's span is suspended between two sets of towers, and is raised and lowered vertically by a system of cables and pulleys. The pulleys are mounted atop each tower, and the cables are connected to concrete and steel counterweights which move up and down on the towers' framework. Counterweights reduce the amount of pull needed to raise the span, and motors are used to regulate the speed at with the span raises or lowers. The first vertical-lift bridge was erected at Halsted Street in 1894 using a design patented by **J.A.L. Waddell**. This was followed by a series of railroad bridges built between 1912 and 1915 from patents developed by Waddell and his business partner, **John Lyle Harrington (1868-1942)**. Their collaboration resulted in some of the most acclaimed vertical-lift bridge designs nationally and internationally.

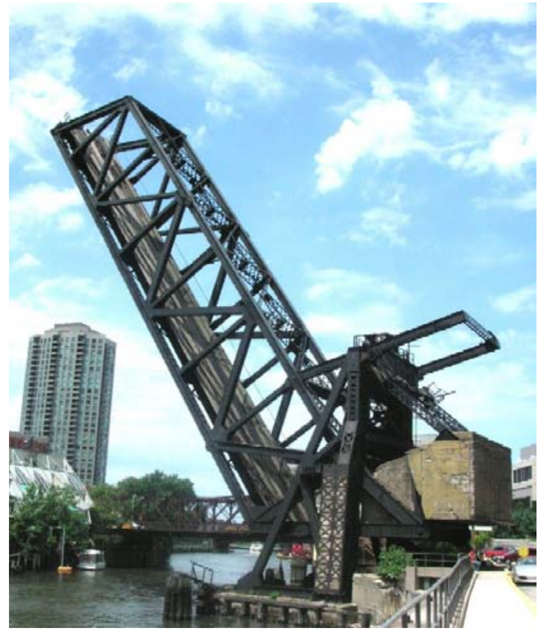
Waddell and Harrington's vertical-lift bridges quickly became national renown as popular alternatives to the designs then available to railroads. Today, these influential designers are credited with bringing the design of the vertical-lift span to maturity during their six-year partnership. Design changes over time have improved the functionality of this bridge type, and newer versions of this type to be built up through the 1960s and 70s. Four bridges identified in this report, including **Bridge 4** (constructed in 1914), **Bridges 9 & 10** (a pair of vertical-lift spans constructed from 1912 to 1915), and **Bridge 12** (constructed from 1967-68) are examples of this bridge type.

Bascule Bridges

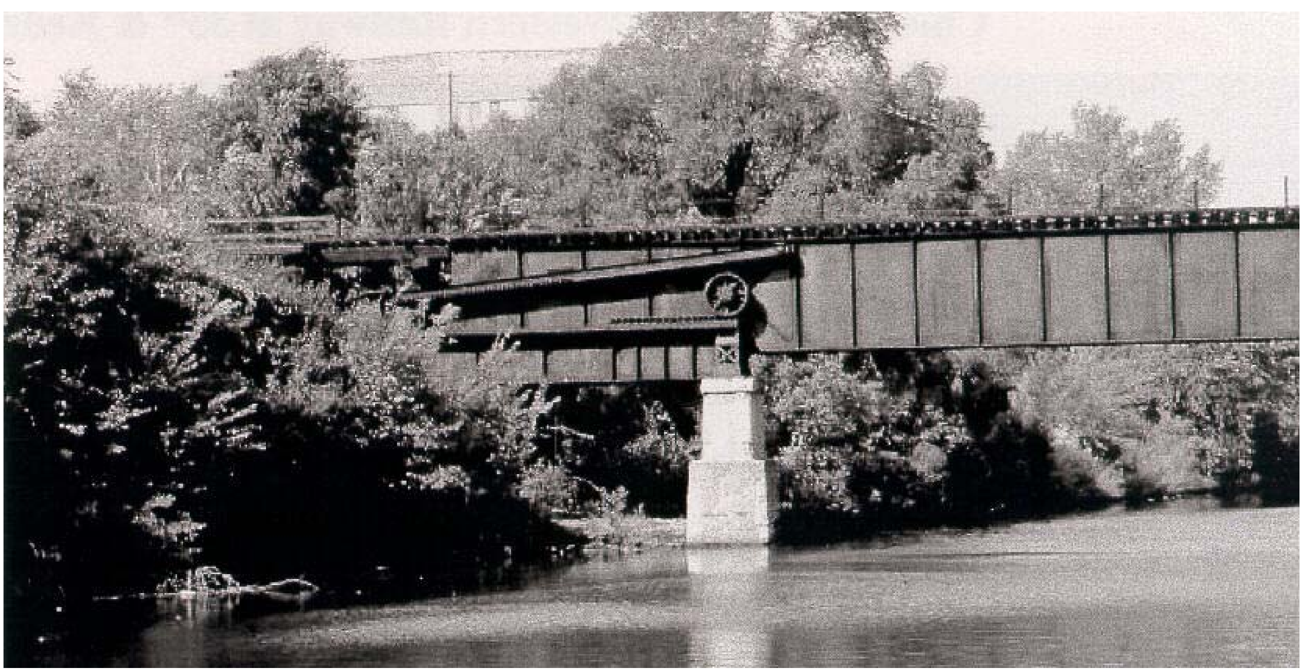
Bascule bridges operate on the same principal as medieval drawbridges. The bridge leaves lift up and back to create a clear navigational channel. During the early 20th century, competition was great amongst structural engineers over the design of the bascule bridge. Since Chicago's railroad companies were primarily using patented bridge designs—which represented patent royalties for the engineer—the result was many versions of this bridge type. The following are named for the engineers who held the patents on the railroad bridge types discussed in this report.

Scherzer Rolling-lift Bascule Bridge – Designed by the great bridge engineer **William Scherzer** and patented in 1893, this single-leaf bascule type is machine-driven and has large wing-like counterweights located on the overhead girders. When engaged, the counterweights tilt downwards, and a large notched rocker arc rolls horizontally along a track girder outfitted with gear teeth, lifting the bridge. The Scherzer rolling-lift type also requires tail pits for the counterweights (which roll back below the roadway) when the bridge is opened. Chicago's first bascule bridge (demolished) was a Scherzer rolling-lift design, built near Van Buren Street in 1894 for the Metropolitan Elevated Railroad. The Pennsylvania Railroad "Eight-Track" Bridge, built in two sections in 1901 and later in 1909-10, and identified in the following catalog as **Bridge 7**, is an example of this bridge type.

Strauss Bascule Bridge – Designed by important Chicago engineer **Joseph Strauss** and introduced in Chicago in 1908, this bascule type is machine-driven and has a single leaf that spans the waterway. Bascule bridges designed by Strauss were popular among railroads throughout the country. The leaf is attached to a frame with an axel and is counterweighted, reducing the amount of force necessary to lift it. The Strauss type has massive visible counterweights which remain high in the air when the bridge is closed, or move into a tail pit when the bridge is open. The counterweights also vary in shape based on the increased weight needed with longer spans. The Chicago and Northwestern Railway Bridge (**Bridge 6** in this report), built in



Several important bascule bridges identified in this report include: (top left) the Pennsylvania "Eight-Track" Bridge, #7 in this report; (top right) the Chicago & Northwestern Railway Bridge, #6 in this report; (left) the Chicago & Alton Railway Bridge, #5 in this report; and (bottom) the Chicago & Illinois Western Railway Bridge, #8 in this report.



Historic railroad bridges are a familiar part of the Chicago skyline and an important visual feature in many neighborhoods. Top: The Pennsylvania Railroad Bridge (#4 in this report) is visible from many vantage points on the Near South Side. Bottom: The Chicago, Milwaukee & St. Paul Railway Bridge (#3 in this report) commemorates the industrial history of Goose Island on the North Branch of the Chicago River.

1907-08, has a large rectangular block, while the St. Charles Air Line Bridge (**Bridge 11,** herein), built in 1917-19, and relocated to its present site in 1930, has a pair of concrete "wings."

Page Bascule Bridge – The engineering firm of Page & Shnable shared the patent on this single-leaf trunnion bascule bridge design. Named for **John W. Page (1868-1967),** a noted Chicago engineer, the bridge has counterweights that are contained within tilting overhead girders, positioned on the outside of the bridge trusses. When driven, the counterweights pivot and roll downward along a pair of curvilinear gear-toothed girders, which tilt the bridge leaves up, giving the appearance that the bridge raises effortlessly without the use of counterweights. The Page type does not require tail pits, since their trusses remain above the water line even when the bridge is open. The Chicago and Alton Railway Bridge (identified as **Bridge 5** in this report), built in 1906, is an excellent example of this bridge type.

Rall Bascule Bridge – Invented by **Theodor Rall**, this single-leaf roller bascule bridge is unique because it combines both the rolling and trunnion motions. In Rall types, the leaf rotates about a pivot or trunnion that is located in the center of the roller (with the assistance of an electric motor and counterweight located below the bridge deck). As the bridge is opened, the movable span rolls backwards along the horizontal track girders. The Rall type does not require a tail pit, since the bridge deck remains above the water line when it is open. The Chicago and Illinois Western Railway Bridge (identified as **Bridge 8** in this report), built in 1914, is a rare-surviving example of this bridge type.

Catalog of Historic Chicago Railroad Bridges

Spanning the city's major waterways, the Historic Chicago Railroad Bridges are a familiar part of the Chicago skyline and an important visual feature in numerous neighborhoods throughout the city. The late-nineteenth century swing-span bridges stretching across the Sanitary and Ship Canal in the South Lawndale neighborhood exemplify early advances in moveable bridge design in the city. Other city neighborhoods historically synonymous with industry such as Armour Square, South Deering, East Side, and Hegewisch, are home to vertical-lift bridges—these massive, multi-ton steel spans are suspended from towers soar as high as nineteen stories.

An ensemble of rare-surviving early bascule bridge designs are situated along the North and South Branches of the Chicago River and the Canal. With names that are almost as unique as their designs, these innovative bascule bridges include: a "bob-tail" swing bridge on the Near North Side, two excellent early "Strauss-type" bridges in the North Loop and the Near South Side, a "Page"-designed bridge in Bridgeport, a "Rall" roller bascule in South Lawndale, and the visually striking "Eight-Track" bascule bridge spanning the canal on the Lower West Side. Together the twelve historic railroad bridges featured in this report visually commemorate the importance of the railroad and the river to the growth and development of the Chicago and its neighborhoods.

The following catalog of the Historic Chicago Railroad Bridges lists the bridges in order of the date of construction.

1. **ILLINOIS CENTRAL RAILROAD SWING BRIDGE**
   North of 35th St., East of Pulaski Rd. near Lawndale Av.
   (Chicago Sanitary and Ship Canal)
   Date: 1898-1900
   Type: Center bearing swing-span
   Designer: Sanitary District of Chicago; Builder unknown

The Illinois Central (IC) Railroad Bridge is one of few surviving swing-span railroad bridges in Chicago. The bridge, which dates from the late 19th century, was part of the system of fifteen bridges constructed by the Sanitary District of Chicago to cross the Sanitary and Ship Canal.

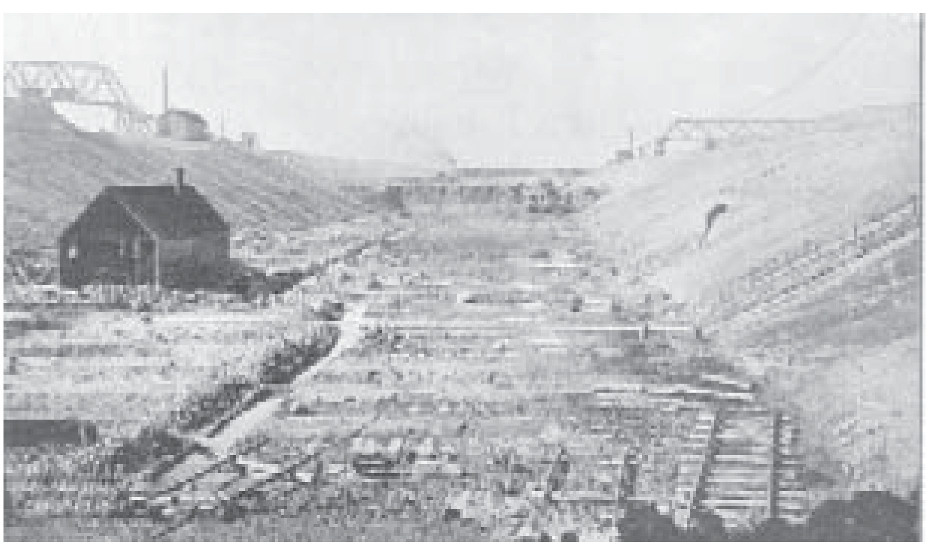
The Sanitary District began construction on the Canal in 1892; when completed in 1900, it comprised a 28-mile waterway extending from the South Branch of the Chicago River at Damen Avenue to Lockport, Illinois. This civil engineering feat, one of largest and most challenging in Chicago's history of municipal works, reversed the natural flow of the Chicago River from east to west. The IC Railroad Bridge was part of a system of fifteen vehicular and railroad bridges initially constructed to cross the canal. Despite the War Department's objections to swing-span bridges, and the obstacles they posed, the Sanitary District went forward and supervised the design and construction of several swing-span type bridges. Over time, a majority of them were replaced with either bascule or vertical-lift bridges.

The IC Railroad Bridge was originally built for the short-line Illinois Northern Railroad, which was part of the Atchison, Topeka & Santa Fe Railway. While the mechanics of this bridge are similar to the Kedzie Street Bridge, this swing-span possesses a different truss design and measures approximately 385 feet in length. The bridge rests on ashlar limestone abutments on the river embankments, with its center pier located in the middle of the canal. The center pier is made from cast concrete and limestone, with its steel plate turntable, and rollers. The bridge is still in use today, but the operating machinery has been removed, and the bridge remains in a fixed position. The sweeping span of the bridge is a familiar visual landmark to those traveling on the Pulaski Road and the Stevenson Expressway.

Top: The IC Railroad Swing Bridge near Lawndale Av. is one of only a few surviving swing-span bridges remaining in Chicago.

Left: A detail of the bridge's central bearing support. Originally, the bridge was designed to pivot on the center support leaving two "lanes" for ships to pass on either side of the bridge.

The IC Bridge was one of fifteen vehicular and rail bridges built to span the Chicago Sanitary and Ship Canal. Bottom: This photo from the 1890s shows the canal basin being cut through the city's Southwest Side. Bridge spans awaiting installation can be seen on either side of the canal.



2. ILLINOIS CENTRAL RAILROAD SWING BRIDGE

North of the Stevenson Exp., East of Kedzie Ave. (Chicago Sanitary and Ship Canal)

Date: 1899-1900

Type: Center bearing swing-span

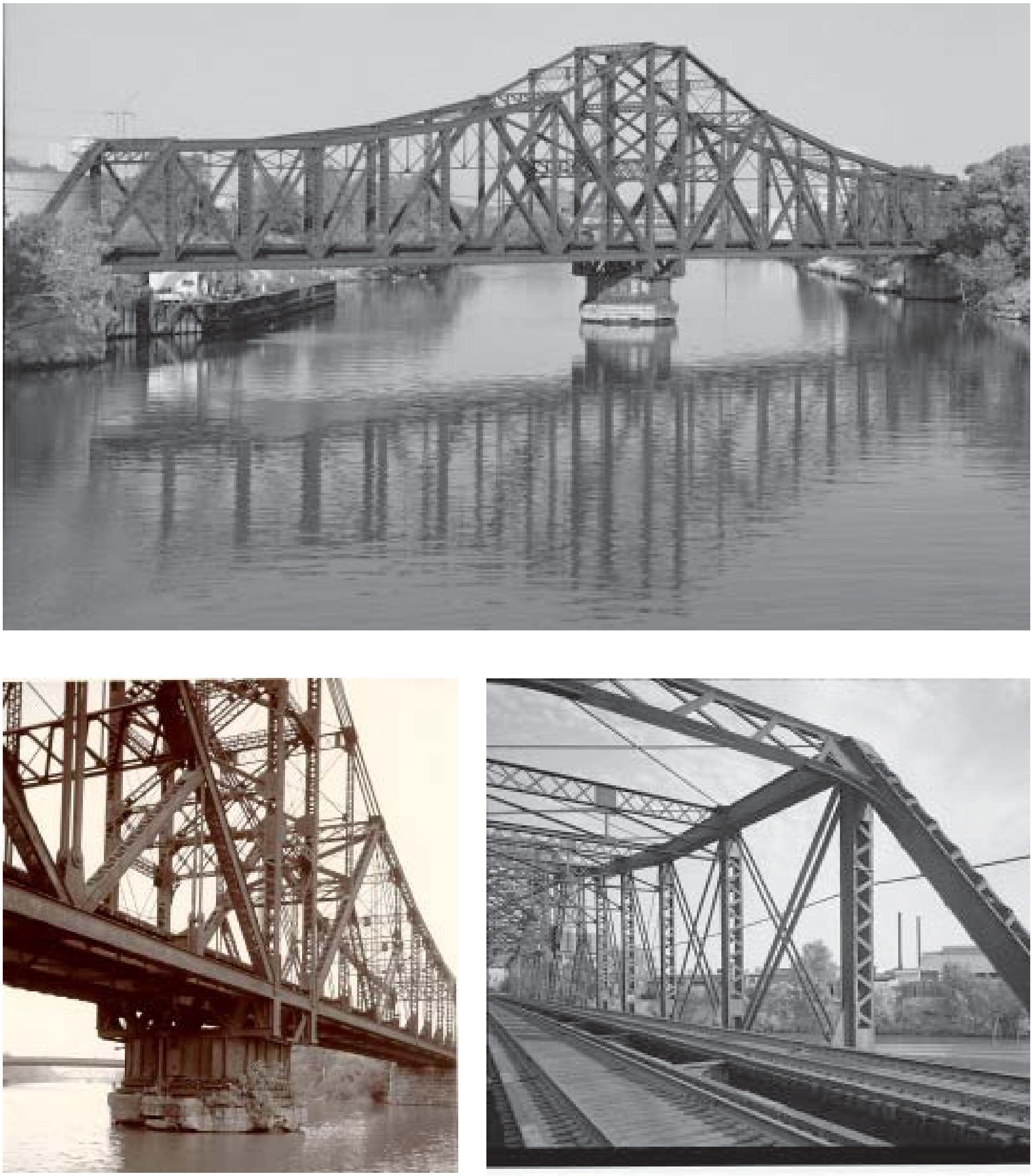
Designer: Sanitary District of Chicago; Toledo Bridge Company, Toledo, OH

This bridge, also owned by the Illinois Central (IC) Railroad, is another rare example of a swing-span bridge in Chicago. When completed in 1900, it featured the longest swing span ever erected for a bridge of its type.

Located across the Chicago Sanitary and Ship Canal, the bridge was originally built for the Chicago, Madison & Northern Railroad and erected by the Toledo Bridge Company of Ohio. This span is made from a single steel truss which measures 479'-5" in length. The bridge rests on ashlar limestone walls on the river embankment, with a center pier located in the middle of the canal. The limestone pier is 32'-6" in diameter, capped with a 28'-0" diameter steel plate turntable and rollers. The bridge pivots on the center pier and when fully opened creates a navigable channel on either side of the pier. The bridge functioned manually when it was first placed into operation in 1899, but by 1900 machinery was installed.

Today, the IC Railroad Bridge is one of the few center-bearing swing-span bridges that remain. Like its neighboring swing-span, **Bridge 1**, this bridge possesses a distinctive visual presence that can be seen from the Stevenson Expressway and Kedzie Avenue. The bridge, which is still in use, remains in a fixed position, and its operating machinery has been removed.

Above: A view of what is believed to be the IC Railroad Bridge shortly after its installation in the Chicago Sanitary and Ship Canal.



Several views of the IC Railroad Bridge including views of the central suport (bottom left) and the steel support structure and railroad tracks that run along the bridge span (bottom right).

3. CHICAGO, MILWAUKEE & ST. PAUL RAILWAY BRIDGE NO. Z-2

North Cherry St., immediately South of North Ave. (North Branch of Chicago River)

Date: 1901-1902
Type: Asymmetrical "bob-tail" swing span
Designers: Chicago, Milwaukee & St. Paul Railway (Milwaukee Road)

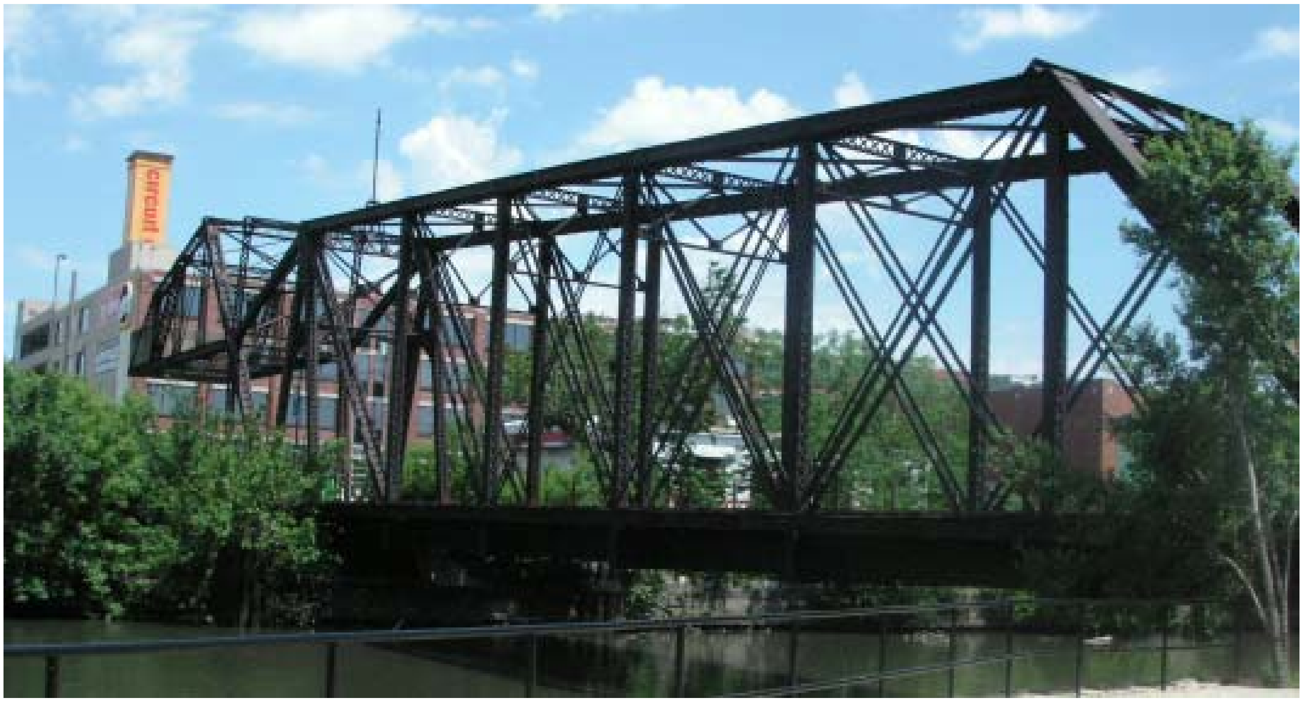
The Chicago, Milwaukee & St. Paul (CM & St. P) Railway's Bridge No. Z-2 is a rare asymmetrical "bob-tail" swing span bridge from the late 19th century. Its significance lies not only with its design, but that the bridge played an essential role in the development of Goose Island, carrying the only rail line to service industries and freight yard there. Its presence on the North Branch of the Chicago River is an important reminder of Goose Island's industrial past and the significant role railroad bridges played in the commercial and industrial development of the city. In addition, the bridge once carried limited vehicular traffic, making it perhaps the only surviving bridge in Chicago that served combined modes of transportation.

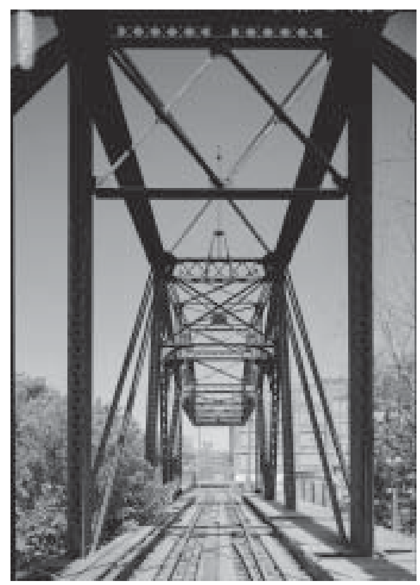
Bridge No. Z-2 is a single-track bridge designed and erected by the Milwaukee Road railroad (owner of the CM & St. P) and fabricated by the Wisconsin Bridge & Iron Co. of Milwaukee. The superstructure is made from 210 tons of steel, with a concrete counterweight weighing 140 tons. The bridge runs on a north-south axis and measures 230 feet in length, of which 120 feet spans over the North Branch of the Chicago River. For pedestrian access, the bridge also has a cantilevered wooden sidewalk that runs along its east side.

The bridge rests on a pivot pier on the north embankment, rather than in mid-channel as with other swing-span bridges of the time. The resulting asymmetric truss is balanced by a massive rectilinear counterweight. The pier is capped with an iron ring girder, wherein a circular nest of 40 wheels support the entire weight of the bridge. The bridge operated by the use of an electric motor which engaged a gear mechanism located between the ring girder and bridge deck. The mechanism forced the bridge to rotate over the nest of wheels, swinging the bridge toward the shoreline. If the power failed, the simplicity in the mechanics of this bridge type allowed it to be operated manually. Originally the bridge also had a wooden operator's house located on the bridge deck directly above the operating mechanism, but it has since been removed.

Completed in 1902, Bridge No. Z-2 is located at the site of a former center-bearing swing span bridge built by the Milwaukee Road in 1882. When the War Department mandated the removal of all swing bridges along the North Branch, the Milwaukee Road was among the first railroad companies in Chicago to replace their bridges with alternate forms. The railroad's Bridge and Building Department designed and erected swing bridges, rather than patented railroad bridge designs. This swing bridge's long-established design made it unpatentable, so the Milwaukee Road was not affected by the expense of royalty payments or patent-infringement litigation as with other Chicago bridge types.

Bridge No. Z-2 owes the necessity of its existence to a canal built by William Ogden, a real estate developer, railroad magnate, and Chicago's first mayor, who was the primary backer for its construction in the mid-1850s. The canal allowed the island to function as an industrial core for Chicago, with tanneries, grain elevators, a coal yard and steel mill as its chief occupants. In 1871, the Atlantic & Pacific Railroad (renamed the Chicago & Pacific in 1872) began constructing a line westward from Goose Island and established a freight yard to move goods off of the island by rail (Goose Island reportedly gets its name from the Irish immigrants who squatted on the surrounding undeveloped land and raised their geese there). Over the decades, the types of industry and railroad ownership changed, but the bridge, constructed in 1901-02, remained as the only railroad link to the island. Today the bridge's operating mechanism has been disabled, and since larger craft no longer use the waterway, the bridge remains locked in the position.





The Chicago, Milwaukee & St. Paul Railway Bridge is a rare asymmetrical bobtail-swing bridge. It rests on a pivot pier (above left) on the north embankment while the span stretches across the North Branch of the Chicago River (above right).

4. PENNSYLVANIA RAILROAD BRIDGE

South of 19th St., East of Lumber St. (South Branch of the Chicago River)

Type: Vertical-lift (span-driven)
Date: 1914
Designers: Waddell and Harrington, Consulting Engineers (Kansas City, MO);
J.C. Bland, Supervising Engineer, Pennsylvania Lines

Upon its completion in 1914, the Pennsylvania Railroad Bridge had the heaviest main span of any vertical-lift bridge in the United States. In addition, it is significant for being the only example of a Waddell and Harrington vertical-lift bridge over the Chicago River, and one of only four known-surviving bridges by the firm in Chicago. Located just south of 19th Street on the South Branch of the river, it was designed by engineers **John Alexander Low Waddell** and **John Lyle Harrington**. Considered to be the most innovative and influential designers of vertical-lift spans, Waddell and Harrington are credited with bringing the design of the important bridge type to maturity during their six-year partnership.

The Pennsylvania Railroad Bridge was fabricated and erected by the Pennsylvania Steel Company of Steelton, Pennsylvania. It has a double-track steel truss span measuring 272'-10" long, which is situated between two towers on each end. The towers, located at each corner of the span, are 195'-0" tall and rest on concrete piers on the river banks. The bridge is operated on the same principles as an elevator, in which the bridge's 1,500-ton span is vertically raised and lowered by a system of 64 cables and 32 pulleys. The pulleys, which are 15 feet in diameter, are mounted atop each tower, and the cables are connected to immense concrete and steel counterweights which move up and down on the towers' framework. When fully open, the vertical-lift bridge reaches a maximum height of 111 feet above river level.

The bridge is powered from a small operator's house located in the middle of the span. Bridges of this kind are referred to as "span-driven." Vertical-lift bridges constructed in later years, where the operating machinery is located in the tower, are referred to as "tower-driven." The latter was a safety measure developed not only for easier access to the operator's house, but to lessen the chance for injury to the bridge operator on the rare occasion when a ship collided with the bridge. In the case of the Pennsylvania Railroad Bridge today, while it still powered by its original equipment, it is operated remotely by a train director at Lake Street.

Begun in 1913, the Pennsylvania Railroad Bridge was reportedly the most cost-effective patented bridge type available, because its simple design meant reduced repair and maintenance costs. This was a far cry from the first vertical-lift bridge built in Chicago twenty years earlier.

In 1893 the city, in its pursuit of finding an alternative to the swing bridge type, contracted to have a vehicular bridge built using a patented design by J.A.L. Waddell (prior to his association with Harrington). It was located on the Chicago River at South Halsted Street, and although it was not the world's first vertical-lift bridge, it was significant because it was the first long-span bridge with a lift of significant height—155 feet above river level. In the end, the bridge (with Waddell's patent royalties) cost the city over $237,000 to build, not including future repair and maintenance costs. The sheer size and expense forced the city to abandon patented bridge designs and after 1900 to use its engineering department to create more suitable vehicular bridges to meet the city's transportation needs. The South Halsted Street bridge was removed in 1934.

The railroad also used similar vertical-lift designs for their two double-track spans over the Calumet River (identified as **Bridges 9 and 10** in this report), constructed from 1912-15, and one bridge built simultaneously with the Pennsylvania Railroad Bridge over the Chicago River. Undoubtedly the Waddell and Harrington vertical-lift bridge was the bridge of choice for the Pennsylvania Lines. Today, the bridge is in use by both freight and passenger rail traffic, but it is unknown whether it gets raised for navigational purposes. A familiar visual landmark to visitors to Ping Tom Park and commuters on the Orange Line and the Metra and AMTRAK trains, the bridge figures prominently into the skyline of the Near South side.

Left: The Pennsylvania Railroad Bridge is a familiar sight on the Near South Side.

The hulking bridge's imposing figure stands in contrast to the Sears Tower (bottom right). The bridge tender's house (bottom left) is situated in the middle of the bridge span and contains the mechanicals which power the bridge.

5. CHICAGO & ALTON RAILWAY BRIDGE

East of Ashland Ave., North of Archer Ave. (South Fork of the South Branch of the Chicago River)

Type: Trunnion bascule
Date: 1906
Designer: Page & Shnable, Patentee, Chicago;
William M. Hughes, Consulting Bridge Engineer, Chicago

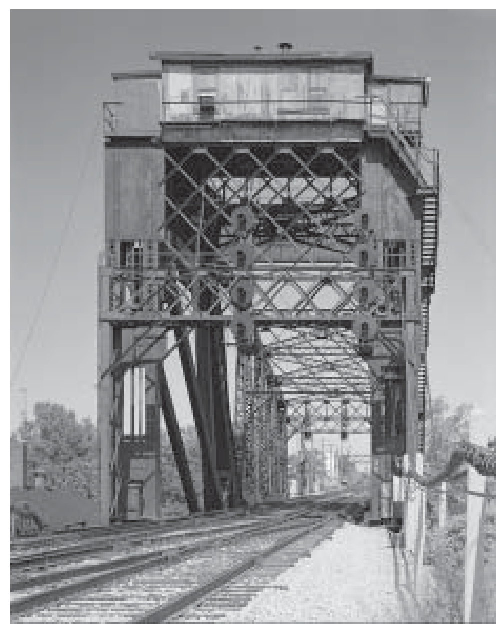
The Chicago & Alton (C&A) Railway Bridge was constructed for the joint use of three railroads: the Chicago and Alton, the Illinois Central, and the Atchison, Topeka & Santa Fe railways. The C&A used the patent of Chicago engineer **John W. Page**, who had worked for the Sanitary District of Chicago's Engineering Department prior to establishing the firm of Page & Shnable in 1901. Not as frequently constructed as other patented bridges, the Page trunnion bascule (as it is often called) is significant for being the first of its kind erected for railroad use, and may be the only one of its kind in existence.

The C&A Railway Bridge, constructed in 1906, is a double-track single-leaf bascule bridge. The superstructure is made from steel and has an approach span 64 feet in length, with the actual bridge spanning 150 feet over the South Fork of the South Branch of the Chicago River. The bridge is operated from a one-story brick building located atop the bridge at the beginning of the approach span. It operates by using two 124-horsepower motors mounted on a frame between two counterweight girders. When driven, the counterweights pivot and roll downward along a pair of curvilinear gear-toothed girders, which tilts the bridge leaf and gives the appearance that the bridge raises effortlessly without the use of counterweights.

Unlike the bridges designed by Joseph Strauss, where the massive counterweights of exposed reinforced concrete exhibit a strong, almost unsightly appearance, the Page bascule counterweights, contained within steel plates, visually blends with the bridge's structure and exhibits a more graceful appearance.

Built in 1906, the C&A Railway Bridge occupies the site of an 1880s swing span bridge that was ordered removed because it was determined to be a navigational obstacle by the War Department. The C&A chose the Page trunnion bascule design based on its observations of the then-recently completed Ashland Avenue vehicular bridge nearby. In addition, the C&A hired William M. Hughes as consulting engineer to oversee construction of the bridge. Hughes, as the Engineer of Bridges for the Sanitary District of Chicago, not only had extensive knowledge of the Page type, but worked on several Page & Shnable designs, including the Ashland Avenue Bridge.

Built at a cost of $165,000, traffic at its peak on the C&A Railway Bridge reached 80 trains per day. The bridge's steel structure is visible from the Stevenson Expressway, however the best views of this bridge are from the Metra and Orange Line trains that frequently travel past it. Today, the bridge is still in use, but no longer needs to be raised for navigational purposes. Its span has been locked down, and its mechanism has been disabled.



The Chicago & Alton Railway Bridge is an example of the Page trunnion bascule-type bridge. The single-leaf structure spans the South Branch of the Chicago River.

6. CHICAGO & NORTHWESTERN RAILWAY BRIDGE

South of Kinzie St., East of Canal St. (North Branch of the Chicago River)

Type: Single-leaf overhead-counterweight bascule
Date: 1907-08
Designers: William H. Finley, Chicago & Northwestern Railway (substructure);
Strauss Bascule & Concrete Bridge Co., Chicago (structure)

Located just north of the Loop, the Chicago & Northwestern Railway Bridge is an excellent early example of an overhead counterweight bascule bridge based on the patents of **Joseph Baermann Strauss**. The bridge was reported to be the world's longest and heaviest bridge of its type at the time of its completion. Joseph Strauss was a prominent Chicago engineer who designed many of the city's early 20th century lift bridges, and later achieved fame as the designer of San Francisco's Golden Gate Bridge. Strauss was also one of a handful of engineers in the United States who achieved their career success not only through the use of their patented bridge designs, but also through the establishment of their own bridge construction firms.

The single-leaf, 800-ton Chicago & Northwestern Railway Bridge is made from heavily-bolted steel girders and plates, constructed by the Kelly-Atkinson Construction Co. of Chicago and fabricated by the Toledo-Massillon Bridge Company of Toledo, Ohio. It is a double-track bridge that spans 170 feet over the North Branch of the Chicago River and has a 27-foot approach deck on its west end. In addition to the span, the superstructure consists of a fixed tower and an overhead counterweight comprised of concrete, reinforced with a heavy steel skeleton weighing approximately 1,247 tons. The leaf's axis of rotation, the main trunnion, is located about halfway up the tower, and power is provided by a pinion which engages a rack on the operating strut to raise and lower the leaf.

The bridge's concrete substructure consists of three parts—the east abutment, which carries the trunnion bearings; the rest pier, which supports the free end of the bascule span; and the west abutment, which supports the 27-foot approach deck. Great Lakes Dredge & Dock Co. of Chicago produced the foundations that consist of concrete caissons situated on piles extending down to bedrock, 117 feet below the river's surface.

The bridge occupies the site of Chicago's first railroad bridge, a pontoon bridge built in 1852 for the Galena & Chicago Union (G&CU) Railroad. This early bridge served the G&CU's Wells Street station located on the east bank of the Chicago River's north branch and was used for both freight and passenger service. In 1864, the G&CU was acquired by the Chicago & Northwestern (C&NW) Railway, which soon became one of the nation's largest and most prosperous railways.

The pontoon bridge was replaced by a swing-span bridge in 1879, but the center pier blocked longer shipping vessels from maneuvering through the tight bends in the Chicago River. In 1897 the U.S. Army Corps of Engineers surveyed the river and highlighted the bridge as one of the river's many navigational obstacles. Despite the survey, the C&NW replaced the bridge with another center pier swing-span bridge in 1898. In 1905 the War Department ordered the removal of the second swing-span bridge and approved the current bascule bridge design. The Chicago & Northwestern Railway opened that single-leaf overhead-counterweight bascule bridge to traffic in 1908.

Today, the Chicago & Northwestern Railway Bridge is no longer in service, due to the rerouting of passenger traffic and dwindling freight traffic. The last remaining freight customer, the *Chicago Sun-Times*, moved its newspaper printing operations out of the area in 2000. The bridge is locked in a raised position creating a massive steel silhouette that is a familiar site to residents of the Near North side and to scores of commuters traveling in the West Loop on the Brown Line and Metra trains.

Left: The Chicago & Northwestern Railway Bridge on the North Branch of the Chicago River is an excellent early example of an overhead-counterweight bascule bridge based on the patents of prominent Chicago bridge designer Joseph Strauss. Bottom: The bridge's massive concrete counterweight weights over 1,200 tons.

7. PENNSYLVANIA RAILROAD "EIGHT-TRACK" BRIDGE
South of 31st St., West of Western Ave. (Chicago Sanitary and Ship Canal)

Date: 1901; 1909-1910
Type: Rolling-lift bascule
Designer: Scherzer Rolling Lift Bridge Company, Chicago

The Pennsylvania Railroad "Eight-Track" Bridge, also known as the Scherzer Eight-Track Bridge, is an example of a patented bascule bridge design by engineer **William Scherzer**, whose brother **Albert H. Scherzer** directed the Scherzer Rolling Lift Bridge Company of Chicago after the death of William Scherzer in 1893. The firm was responsible for designing and erecting nearly twenty of Chicago's railroad and vehicular bridges. The Scherzer Eight-Track Bridge is distinguishable not only by its look, but is significant for being the last of its kind erected in Chicago for railroad use.

The Scherzer Eight-Track Bridge is made of steel and is comprised of four side-by-side Scherzer rolling-lift, single-leaf, double-track bridges set in alternating positions which can not only operate as four independent bridges, but connected, can operate simultaneously as a single structure. Each bridge is approximately 200 feet long (including approach spans), 58 feet high, and, with its steel-reinforced counterweights , weighs 1,738 tons. Each is placed 20 inches apart from its adjacent bridge span, and in the closed position, all have a 16-foot vertical clearance above the river level. When fully opened, the structure provides a navigational channel 120 feet wide.

The structure rests on the limestone piers of prior bridges, built in 1901, on the site, and are reinforced with metal shell cast-in-place concrete piles. Each bridge is operated by two 50-horsepower motors, which work in conjunction with massive reinforced concrete counterweights and rocker arcs. The machinery is controlled from two operator's houses, each located on the outside of the structure and on opposite sides of the canal.

The Scherzer Eight-Track Bridge dates from the early years of the Chicago Sanitary and Ship Canal, which was completed in 1900. The structure was constructed in 1901 as four fixed, parallel, double-track bridges by the A. & P. Roberts Co. of Philadelphia for the Scherzer Rolling Lift Bridge Company. The bridges were used by three railroads: the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad (4 tracks); the Illinois Stock Yards & Transit Railroad (2 tracks); and the Chicago & Northern Pacific Railroad (2 tracks).

In 1907, a law passed by the Sanitary District of Chicago required that by 1909 all fixed bridges along the canal be converted to moveable bridges in order to provide unobstructed navigation. As the deadline approached, the Sanitary District awarded the design contract to the Scherzer Rolling Lift Bridge Company, and the fabrication and construction contract to the Chicago Bridge & Iron Works. Albert Scherzer, also an engineer, reused and reconfigured the 1901 bridges into its current design, which was fully operational by 1910.

The look of the Scherzer Eight-Track Bridge is one of the most unusual of Chicago's many bascule bridges. The structure has a graceful triangular symmetry produced by the inclined tops of the alternating counterweights, but this is the result of purely functional purposes, rather than for aesthetics. The opposite placement of the massive reinforced concrete counterweights is not only to reduce the amount of compression on the reinforced piers, but their spacing prevents them from colliding while in operation. The bridge was overhauled and its machinery upgraded during World War II. Today the bridge is fixed in place and still in use. The striking structure can be seen from such highly-traveled routes as Western Avenue and the Stevenson Expressway.

The Pennsylvania Railroad “Eight-Track” Bridge is significant for being the last Scherzer Rolling-Lift Bridge erected in Chicago for railroad use. The bridge encompasses four side-by-side bridges (bottom right). The counterweights are situated on alternating ends of each span (bottom left).

8. CHICAGO & ILLINOIS WESTERN RAILWAY BRIDGE

33rd St., East of Kedzie Ave. (Slip of Sanitary and Ship Canal)

Date: 1914

Type: Single-leaf roller bascule

Designers: Theodor Rall (Strobel Steel Construction Company, Chicago)

The Chicago & Illinois Western (C&IW) Railway Bridge is a rare-surviving example of a patented bridge design by **Theodor Rall**. The Rall type was one of the designs used by the railroads in the early twentieth century, and is significant for combining the bascule bridge technologies of both rolling and trunnion motion.

The C&IW Bridge is a single track, single-leaf bascule bridge which runs on an east-west axis over a slip in the Chicago Sanitary and Ship Canal. This low-profile bridge measures approximately 135 feet, and has a steel deck girder span of 90 feet over the waterway. Three unevenly-spaced piers made from reinforced concrete support the bridge and approach spans, with the middle span supporting the bridge's concrete counterweight on the west end. Visible on the sides of the bridge near the counterweight are struts and a trunnion located in a large roller which, when engaged with an electric motor (located below the bridge deck), pulls the leaf up and rolls it backwards along the horizontal track girders.

Completed in 1914, the C& IW Bridge was built to serve barge traffic for nearby industries along the Sanitary and Ship Canal. The Rall-type bascule bridge was invented by Theodor Rall, but the patent for the bridge was held by the contractor, Strobel Steel Construction Company of Chicago—unique, since patents were typically held by the engineers. Despite being considered economical and easy to maintain, the Rall design was not as widely used as the Strauss and Scherzer bascule types. Today the bridge's mechanism has been disabled and it remains in a fixed position.

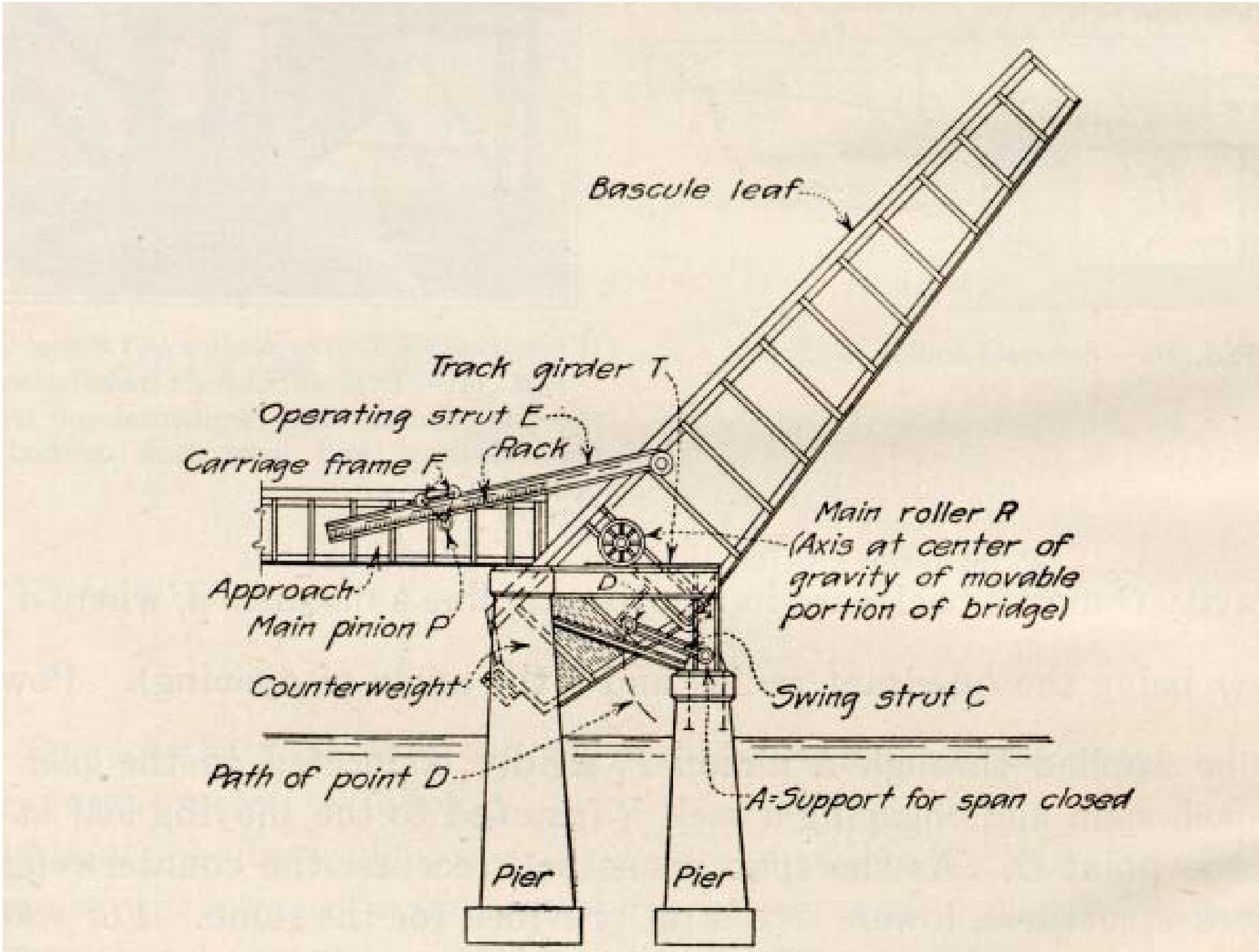


FIG. 13.—Rall type bascule bridge (deck girder span).

The Chicago & Illinois Western Railway Bridge is a rare-surviving example of a bridge design by Theodor Rall, a leading railroad bridge engineer. The bridge features a single leaf attached to a main roller (above). Near the bridge's counterweight are struts and a trunnion (left) that, when engaged, raise the leaf.

9. & 10. LAKE SHORE & MICHIGAN SOUTHERN RAILWAY BRIDGES

East of Chicago Skyway, North of 98th St. (Calumet River)

Date: 1912-1915

Type: Pair of vertical-lift bridges (span/tower-driven)

Designers: Waddell & Harrington; Dravo Contracting Co., Pittsburgh (substructure)

The Lake Shore & Michigan Southern (LS&MS) Railway bridges over the Calumet River are among four surviving examples of the "span-driven" vertical-lift type in Chicago. Built from patents developed in the early 20th century by the Kansas City-based engineering firm of Waddell and Harrington, this pair of parallel vertical-lift bridges are a dominating visual landmark to the surrounding area and were a popular alternative to the bascule bridge designs available to the railroads at that time.

The LS&MS Bridges are two adjacent, double-track, steel-truss spans and make up the largest multiple installation of Waddell and Harrington's patented design. Each span measures 209'-9" long and crosses the Calumet River on an east-west axis, skewed at about 50 degrees. The towers that support the spans are 190 feet tall and share a foundation with a remnant of the Pittsburgh, Fort Wayne & Chicago (PFW&C) Railway's Bridges. Built in 1912-13, the PFW&C Bridges were a nearly identical pair of vertical-lift bridges originally located immediately east of the LS&MS Bridges (today only a portion of the PFW&C Bridges survive). Operating on the same principles as an elevator, the bridges' 1,100-ton spans are vertically raised and lowered by a system of cables and pulleys. The pulleys, which are 15 feet in diameter, are mounted atop each tower, and the cables are connected to immense concrete and steel counterweights suspended outside the tower framework. When fully open, the spans reach a maximum height of 120 feet above river level.

The spans operate independently or as a single unit with assistance of motors located in a control room at the east tower portals. Mid-span is an operator's house, but it was never used. Despite every visual indication that the bridges are the "span-driven" type, rudimentary design changes permitted the operator to control the bridges from the tower rather than ride with the moveable span. "Tower-driven" vertical-lift bridges not only allowed easier access to the bridges' machinery, but lessened the chance for injury to the bridge operator on the rare occasion when a ship collided with the structure. Today, Lake Shore & Michigan Southern Bridges are no longer in use. The operating machinery has been removed from the control room, and the bridges remain in a partially raised position. The massive bridges create a striking site that is seen daily by thousands of travelers on the Chicago Skyway.

Top: The Lake Shore & Michigan Southern Railway Bridges are two adjacent, double track, steel-truss spans that together make up the largest multiple installation of Waddell and Harrington vertical-lift bridges. Bottom: Situated immediately west of the LS&MS pair of bridges is a portion of a span that once was part of the Pittsburgh, Fort Wayne & Chicago Railway Bridge (center) and further west is the Chicago Skyway (far right).

11. ST. CHARLES AIR LINE BRIDGE

North of 16th St., East of Lumber St. (South Branch of the Chicago River)

Type: Single-leaf heel trunnion bascule
Date: 1917-1919; relocated in 1930
Designer: Strauss Bascule & Concrete Bridge Co., Chicago (structure)

Located south of the Loop at 16th Street, the St. Charles Air Line (SCAL) Bridge was the world's longest and heaviest single-leaf bridge when completed in 1919. Designed by the acclaimed Chicago bridge engineer **Joseph B. Strauss**, the SCAL Bridge was built using many of the design principles as the Chicago & Northwestern Railway Bridge (constructed in 1908). However, the SCAL Bridge is significant because it is an excellent example of a "heel trunnion" bascule bridge, a design developed by Strauss specifically for long bascule spans.

The superstructure of the SCAL Bridge is made from heavily-bolted steel girders and plates, combined with its massive reinforced concrete "wing-shaped" counterweights. It is a double-track single-leaf bridge that spans 220 feet over the South Branch of the Chicago River. There are two sets of trusses, 32'-4" apart, with one set bracing the leaf, and the other the operator's tower. The other set consists of a pair of rocking trusses, 42'-4," apart that supports the bridge's trunnions and counterweights. The SCAL Bridge was also the first of its kind to have air-buffered pistons mounted on its operating struts. As the span fully opens, the pistons hit against a bumper on the tower to prevent a sharp impact. The buffers and breaks on the SCAL Bridge constitute the safety measures introduced by Strauss on the heel trunnion design.

In addition to this innovation, the St. Charles Air Line, established in 1855, was an unusual example of the city's burgeoning railroad companies cooperating on the interchange of railroad traffic. Four connecting railroads—the Chicago Burlington & Quincy (CB&Q); the Galena & Chicago Union (G&CU); the Illinois Central (IC); and the Michigan Central (MC)—agreed to equally share construction and operating costs for the SCAL, which runs east-west in the block between 15th and 16th Streets, and crosses the South Branch of the Chicago River at its western end. Within a distance of less than one mile, the SCAL connected the shared IC-MC tracks on the east river bank with the G&CU's tracks on the west bank, via the CB&Q's tracks.

The SCAL's first bridge—a single-track wooden swing-span—was opened to traffic in 1856, but due to its heavy usage, was replaced in 1882 with a double-track, steel, swing-span bridge on a center pier. Even with two tracks, bridge operations proved to be time-consuming and complicated by the bridge's frequent openings. Additionally, the federal government's River and Harbor Act of 1899 determined that center-pier swing bridges were navigational obstacles. By the start of the 20th century, the city was developing plans to straighten the South Branch of the Chicago River, delaying the SCAL's bascule bridge replacement. When it became clear that the straightening might not occur for years due to the onset of World War I, the War Department insisted that the South Branch be cleared of obstructions.

In 1916, the IC's engineers initiated plans to build a single-leaf bascule bridge over the South Branch. Once they determined that the bridge span would have to be at least 260 feet in length, they called upon Joseph Strauss to assist with the design. Constructed by the Ferro-Construction Company of Chicago with over 1,500 tons of structural steel fabricated by the American Bridge Co.'s plant in Gary, Indiana, the 260-foot bridge was completed in 1919. Upon its completion, the bridge exceeded the previous world record (held by Strauss for the Baltimore & Ohio (B&O) Railroad's span over the Calumet River) by 30 feet.

Over ten years passed before construction was started on the straightening of the South Branch of the Chicago River, and once the new channel was opened in 1929, the extreme length of the SCAL Bridge was deemed unnecessary. The SCAL moved to a temporary trestle while the bridge was dismantled, shortened by 40 feet, and re-erected by Strobel Steel Construction Co. of Chicago at its present location. New counterweights also had to be cast after it was determined that the bridge's massive concrete counterweights were too expensive to move. The old counterweights were broken up and discarded.

In addition to these changes, the War Department insisted that the SCAL be built adjacent to the B&O's relocated bridge to consolidate the two railroads onto one alignment at 16th Street. A new operator's tower was built between the two bridges so the pair could function either independently or as a single unit. Today, the St. Charles Air Line Bridge is frequently used by both freight and passenger trains, and, while seemingly in a fixed position, it may still be operable. One of the most visible bridges in the city, the SCAL can be viewed throughout the Near South from vantage points on Roosevelt Road and Clark Street.

The SCAL Bridge (above) was the world's longest and heaviest bridge upon its completion in 1919. The bridge was shortened and moved to its current location in 1930 following the straightening of the South Branch of the Chicago River.

Designed by prominent bridge designer Joseph Strauss, the bridge features wing-shaped counterweights (top left) that give it a distinctive appearance. A view of the bridge's span as it appears today (left).

12. CHICAGO & WESTERN INDIANA RAILROAD BRIDGE

North of 126th St., East of Torrence Ave. (Calumet River)

Date: 1967-1968

Type: Vertical-lift (tower-driven)

Designers: James Peterson, Chief Engineer, Chicago & Western Indiana Railroad; Alfred Benesch & Associates, Consulting Engineers, Chicago

The Chicago & Western Indiana (C&WI) Railroad Bridge is an outstanding example of a "tower-driven" vertical-lift bridge, characterized by its operating machinery mounted upon the two towers of the bridge that contain the counterweights. Located on the Calumet River on Chicago's East Side, the bridge is based on the patents developed in the early 20th century by the Kansas City-based firm of Waddell and Harrington, yet is the modern counterpart to the firm's popular "span-driven" bridges built between 1912 and 1915 in Chicago.

The C&WI Bridge was fabricated and built by the American Bridge Co. of Gary, Indiana, and the Corbett Construction Company of Chicago. It is a double-track moveable span bridge with steel trusses measuring 281'-8" long and 45'-0" deep. The spans are suspended between a pair of 210-foot towers and have a vertical lift of 125 feet above the river level. Its towers rest on concrete piers extending 80 to 90 feet to bedrock, and the approach spans' piers and abutments are supported by metal shell cast-in-place concrete piles.

The bridge is operated on the same principles as an elevator, in which its immense span is vertically raised and lowered by a system of 64 cables and four giant pulleys weighing 56 tons each. The cables are connected to massive steel-encased concrete counterweights which are suspended within the towers' framework. The bridge is powered by gasoline motors housed at the base of the north tower, while the control room located at the top of the tower gives the bridge operator a commanding view of the area.

In 1909, the C&WI Railroad was ordered by the War Department to replace its swing-span bridge previously located on this site with a Strauss trunnion bascule design. Also at this time, the channel beneath the bridge was dredged to a width of 120 feet. In 1947, the Army Corps of Engineers proposed the widening of the Calumet River to 200 feet beneath the C&WI's Strauss-type bridge. Twenty years later, the railroad replaced its Strauss-type bridge with its current vertical-lift design. The C&WI Bridge sits immediately east of the Torrence Avenue vehicular vertical-lift bridge (completed in 1939). Together they provide a dominating visual presence to the surrounding area. Today the C&WI Bridge is no longer in use and is currently in a raised position.

Top: The Chicago & Western Indiana Railroad Bridge is an outstanding example of a "tower-driven" vertical-lift bridge. Left: The span was designed to be raised and lowered by a system of giant pulleys and cables.

Criteria for Designation

According to the Municipal Code of Chicago (Sec. 2-120-620 and -630), the Commission on Chicago Landmarks has the authority to make a preliminary recommendation of landmark designation for a building, structure, or district if the Commission determines it meets two or more of the stated "criteria for landmark designation," as well as possesses a significant degree of its historic design integrity.

The following should be considered by the Commission on Chicago Landmarks in determining whether to recommend that the proposed Historic Chicago Railroad Bridges be designated as Chicago Landmarks.

Criterion 1: Critical Part of the City's History

Its value as an example of the architectural, cultural, economic, historic, social or other aspect of the heritage of the City of Chicago, the State of Illinois or the United States.

- Essential to the development of industrial and manufacturing operations along the Chicago River, the Calumet River and the Sanitary and Ship Canal, the Historic Chicago Railroad Bridges exemplify the transformation of the city from a bustling port into the preeminent railroad hub and distribution center for the United States in the late nineteenth century.

- The Historic Chicago Railroad Bridges have played an integral role in Chicago's industrial and commercial development by enabling rail and water transportation to circulate through the city with relatively little interference, thereby creating a transportation network more efficient than any other in the United States.

- The Historic Chicago Railroad Bridges exemplify early innovative bridge designs created by prominent designers and demonstrate the evolution of moveable bridge design in Chicago that would ultimately establish the city as the leader in the field of bascule bridge design in the late nineteenth and early twentieth centuries.

Criterion 4: Important Architecture

Its exemplification of an architectural type or style distinguished by innovation, rarity, uniqueness, or overall quality of design, detail, materials, or craftsmanship.

- The Historic Chicago Railroad Bridges represent some of the earliest, rarest, and most historically significant examples of bridge designs in the city.

- The Historic Chicago Railroad Bridges represent several important patented types of moveable bridges and demonstrate the innovative bridge designs developed in the Chicago in the 1890s.

- The Historic Chicago Railroad Bridges include several early movable bridges that are rare-surviving examples of the first of two types of significant bascule bridges to be erected in Chicago. These bridges are important predecessors to the Chicago-type trunnion bascule bridges that today are a familiar sight along the Chicago River and around the world.

Criterion 5: Important Architect

Its identification as the work of an architect, designer, engineer, or builder whose individual work is significant to the history or development of the City of Chicago, the State of Illinois, or the United States.

- The Historic Chicago Railroad Bridges were designed by some of the most influential individuals and firms in the field of bridge design, including Waddell and Harrington, the firm credited with the development of the vertical-lift bridge, and prominent bascule bridge designers William Scherzer, Joseph Strauss, and John W. Page.

- The innovative moveable bridge designs patented by groundbreaking engineers J.A.L. Waddell and William Scherzer lead to the emergence of Chicago as a great incubator for bridge technology—producing important Chicago civil engineers Joseph Strauss and John W. Page and attracting other important bridge designers from around the United States.

Criterion 7: Unique Visual Feature

Its unique location or distinctive physical appearance or presence representing an established and familiar visual feature of a neighborhood, community, or City of Chicago.

- Spanning the city's major waterways, the Historic Chicago Railroad Bridges are a familiar part of the Chicago skyline and an important visual feature in numerous neighborhoods throughout the city, and visible from such vantage points as the Stevenson Expressway, the Chicago Skyway, the downtown Loop and Ping-Tom Park.

- Like massive steel sculpture stretching skyward, the Historic Chicago Railroad Bridges visually commemorate the importance of the railroad and the river in the growth and development of the City of Chicago.

Integrity Criterion

The integrity of the proposed landmark must be preserved in light of its location, design, setting, materials, workmanship and ability to express its historic community, architectural or aesthetic interest or value.

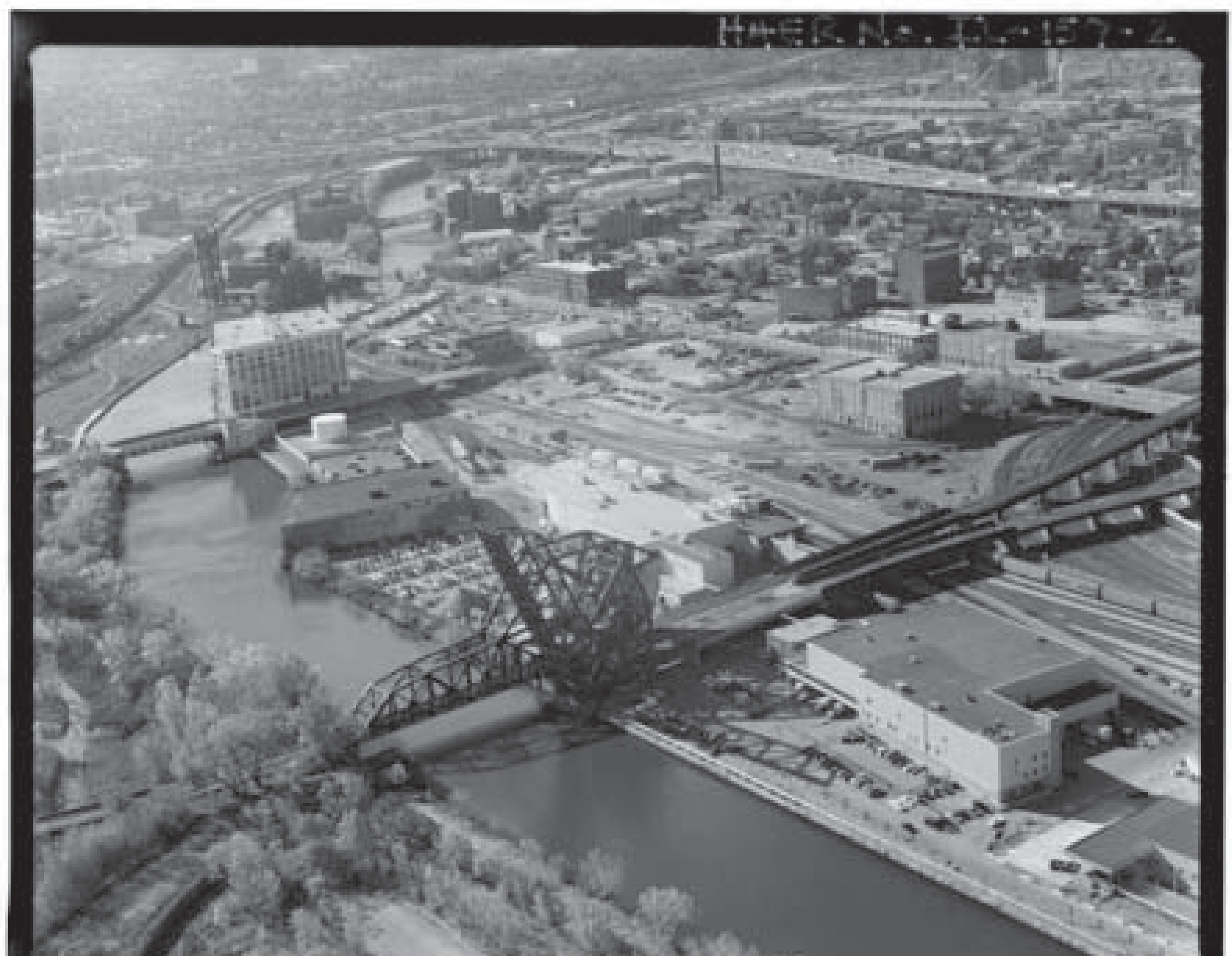
Overall the Historic Chicago Railroad Bridges retain excellent physical integrity, displaying through their site, scale, and overall design their historic importance. They retain the majority of their historic materials and original design features that impart to the viewer a strong sense of their historic visual character. Common changes to the historic railroad bridges include the replacement of decking on the span and, in some cases, the removal of mechanicals to allow for operation. Many of these bridges no longer operate and are locked in a fixed position. These changes, however, have little to no impact on the bridges' historic visual character.

Significant Historical and Architectural Features

Whenever a building is under consideration for landmark designation, the Commission on Chicago Landmarks is required to identify the "significant historical and architectural features" of the property. This is done to enable the owners and the public to understand which elements are considered most important to preserve the historical and architectural character of the proposed landmark.

Based on its preliminary evaluation of the Historic Chicago Railroad Bridges, the Commission preliminarily determined that the significant features be identified as:

- all exterior elevations, of the structure including masonry abutments and any bridge houses.



Spanning the city's major waterways, the historic railroad bridges visually commemorate the importance of the railroad and the river in the growth and development of Chicago. The St. Charles Air Line Bridge (Bridge #11 in this report) is seen in the context of its Near South Side neighborhood.

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ILLUSTRATIONS

Department of Planning and Development: pp. 3, 21 (top), 23 (bottom left) and 27.
From Mayer and Wade: pp. 5, 6 (middle), 9 (top).
Courtesy of the Chicago Historical Society: p. 6 (top and bottom), and 9 (middle).
From Viskochil: 9 (bottom).
American Memory, Digital ID: ichiedn n063297: p. 11 (top left).
American Memory, Digital ID: ichiedn n006686: p. 11 (bottom right).
From Waddell: p. 11 (top center).
From Heavymovablestructures.org: p.11 (top left).
From http://patsabin.com/illinois/JackKnife.htm: p. 11 (middle).
From www.pbs.org/wgbg/amex/goldengate: p. 11 (bottom left).
Benjamin Johnson, Johnson Lasky Architects: pp. 13 (top left and right and bottom), 17 (top and middle), 19 (bottom left), 21 (bottom left and right), 30, 31 (bottom), 33 (top) and 37.
Historic American Engineering Record: pp. cover, 13 (middle), 14, 19 (top and bottom right), 23 (top and bottom right), 25, 29, 33 (bottom), 35 and 40.
From the New Students Reference Work: pp. 17 (bottom) and 18.
From Hool: p. 31 (top).

The Commission on Chicago Landmarks, whose nine members are appointed by the Mayor and City Council, was established in 1968 by city ordinance. It is responsible for recommending to the City Council that individual buildings, sites, objects, or entire districts be designated as Chicago Landmarks, which protects them by law. The Commission is staffed by the Chicago Department of Planning and Development, 33 N. LaSalle St., Room 1600, Chicago, IL 60602; (312-744-3200) phone; (312-744-2958) TTY; (312-744-9140) fax; web site, http:www.cityofchicago.org/landmarks.

This Preliminary Summary of Information is subject to possible revision and amendment during the designation proceedings. Only language contained within the City Council's final landmark Designation ordinance should be regarded as final.

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