

Willamette River Bridges
Spanning Willamette River at various locations
Portland
Multnomah County
Oregon

HAER OR-55

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HISTORIC AMERICAN ENGINEERING RECORD

**WILLAMETTE RIVER BRIDGES
HAER OR-55**

Location: Spanning the Willamette River, Portland, Multnomah County, Oregon

**Dates of
Construction:** 1910-1931

Significance: The four Portland bridges recorded by the Oregon Historic Bridge Recording Project were built between 1910 and 1931, and reflect the suburban expansion of Portland across the Willamette River. Designed by such nationally known bridge engineers as Gustav Lindenthal, David Steinman, J.A.L. Waddell, and Ralph Modjeski, these bridges include the oldest extant vertical lift bridge in the United States and the only telescoping vertical lift bridge in the United States.

**Project
Information:** Documentation of the Willamette River Bridges is part of the Oregon Historic Bridge Recording Project, conducted during the summer of 1990 under the co-sponsorship of HABS/HAER and the Oregon Department of Transportation. Researched and written by Gary Link, HAER Historian, 1990. Edited and transmitted by Lola Bennett, HAER Historian, 1992.

**Related
Documentation:** See also HAER reports OR-20, OR-21, OR-22 and OR-40

MOVEABLE BRIDGES

Until 1925 all bridges built across the Willamette River at Portland, Oregon were of the moveable type. A moveable bridge is one that includes one or more spans that change position so that a river-going ship may pass. There are three types of moveable bridges: the swing span, the vertical lift, and the bascule.

A swing span bridge has at least one span that rests on a central pier. To open, this span pivots 90 degrees to a position parallel with the river. A ship may then pass on either side of the pier. Most early moveable bridges in America were swing spans. However, in the late 19th century the vertical lift span was developed. This type of bridge has one span which is raised vertically in the horizontal position, usually by cables suspended from towers located on each end on the span. Vertical lift bridges were favored over swing spans because they opened and closed faster, and did not have a central pier obstructing the channel. The third type is the bascule bridge. This type has one or two "leaves" which are hinged on one end and while the other end swings upward. This type of bridge is commonly thought of as a drawbridge. The bascule became the most popular type of moveable bridge. It has the speed of the vertical lift bridge. It is also safer for highway traffic. An errant vehicle may drive off the edge of the approach spans of a swing span or vertical lift bridge, but the rising leaves of a bascule provide a natural barrier to crossing traffic.

Bridge building in Portland followed this general trend. The earliest bridges built were swing spans. Two vertical lifts were built in 1910 and 1912. Later movables were bascule spans.

EARLY HISTORY OF PORTLAND

Today Portland, Oregon is a major city bisected by the Willamette River. The original settlement of 1841 (the city was incorporated in 1845) was on the west bank of the river. It was located roughly twelve miles south of the Willamette's confluence with the Columbia River, near the southern end of a deep-water channel. With deep-water navigation for ocean-going vessels and access to a productive hinterland--the Willamette and Tualatin valleys to the south--Portland grew rapidly. Through the 1870's Portland shipped mainly products from these two valleys, but in the 1880's became a port for the entire Pacific northwest region. During this period the city became wealthy from the industries of transportation (a transcontinental railroad line hooked up in Portland in 1883), merchandising, banking, and later, manufacturing. Between 1860 and 1890, the population increased dramatically from 821 to 46,385.¹

On the east bank of the Willamette River across from Portland a community arose from settlements along the Oregon & California Railroad lines. In 1870 this community incorporated as the city of East Portland. With Portland hemmed in on the west and south by hills, its population spilled over to the east bank. Portland remained a business center while East Portland became a rapidly-growing residential area. At the turn of the century East Portland held one-third of the population of the two communities.²

An adjacent community to the north of East Portland incorporated in 1887 as the city of Albina. This community also got its impetus from railroad lines along the Willamette River. Its 1880 population of 143 had increased by 1891 to 6,000 persons.³

In June of 1891 the citizens of Portland, East Portland, and Albina voted to consolidate the three municipalities into one city named Portland. Consolidation became official on July 6, 1891. The population on the west bank continued to grow, but was outpaced by people settling on the open lands of the east side. In 1906 the population on the east side surpassed that on the west for the first time. In 1910 the west side had 86,000 people, the east side had 120,000.⁴

WILLAMETTE RIVER BRIDGES THROUGH 1931

When looking at the dates of bridge-building across the Willamette River in Portland through 1931 one can observe three general periods or "waves" of construction. These waves correspond with three periods of growth within the city. The first wave corresponded with the initial growth of the new city which found itself in an advantageous location. The second wave resulted from a purposely-induced period of economic growth. And the third wave stemmed from a growth of population not just of people but of automobiles.

1887-1894

For over four decades Portland had no bridges. Citizens crossed the Willamette River via several privately-owned ferries. But with the business center on the west side and the residential center on the east side, the ferries became inadequate to accommodate the large volume of crossing traffic. The ferry interests opposed the building of bridges, as did the shipping interests, which claimed that bridges would obstruct river traffic. By the 1880's, however, the burgeoning population on both sides of the Willamette River required that bridges be built.⁵

The first bridge across the Willamette River in Portland was the Morrison Street Bridge, built in 1887. It was a wooden truss bridge. Like all bridges built in Portland before 1910, it was a swing span bridge. And like all bridges built before consolidation, the Morrison Street Bridge was privately owned and tolls were charged for use.

The next bridge opened in 1888 and was a double-decked, all-steel construction structure called simply the Steel Bridge. The Steel Bridge was owned and operated by the Oregon Railway & Navigation Company, which used the lower deck for its railroad cars. The upper deck opened in 1889 to highway traffic, connecting Glisan Street on the west to Albina. Portland's first electric streetcar railway crossed this deck. The railroad charged a toll on the upper deck until Multnomah County began paying rent to make crossings toll-free.

Portland's third bridge was the Madison Street Bridge, another wooden truss swing span. Built in January 1891, this bridge was built to provide the Mount Tabor streetcar line in East Portland access to Portland's business center. After consolidation, the city of Portland began purchasing the privately owned bridges to make them toll-free. The city purchased the Madison Street Bridge first, in November 1891. (In 1895 the city bought the Morrison Street Bridge.) The first Madison Street Bridge was light and not of durable construction. It was replaced in 1900. The second Madison Street Bridge was the last wooden bridge built across the Willamette River in Portland.⁶

The fourth bridge built across the Willamette River at Portland was the Burnside Bridge, a wrought-iron truss structure completed in 1894. This was the first publically-built bridge in Portland. It served the Portland, Vancouver and Northern Railway Company's streetcar line.⁷

This first wave of bridges provided access across the Willamette River that the ferries could not give the burgeoning city. They also served the streetcar interests (which were active in bridgebuilding capital companies) which used the bridges to connect and expand their lines. The bridges effected the nature of the city. After the Morrison Street Bridge was completed, the retail center of the city shifted from First and Ankeny Streets to Morrison Street. The Morrison Street Bridge also, along with the streetcar lines, helped facilitate the rapid growth of East Portland. Most importantly, this first wave of bridges served to unify a growing community which may otherwise have developed into separate economic and political entities.⁸

1905-1913

In the years 1890 through 1915 Portland enjoyed tremendous urban growth. During this period the population increased 300 percent and the land area increased 150 percent. Through 1905 the streetcar lines played a major role in this expansion. Then the city took steps to generate more growth. In 1905 Portland held a world exposition designed to display its assets and boost economic activity in the area. The exposition-generated boom resulted in great confidence of Portlanders in their economy.⁹

Portland voters showed this confidence by approving money for four new bridges. In 1905 the Morrison Street Bridge was replaced by the second Morrison Street Bridge--the last swingspan highway bridge built in Portland. In 1910 the second Madison Street Bridge was replaced by the Hawthorne Bridge, an all-steel vertical lift bridge. Two years later, the Steel bridge was replaced by a double-decked vertical lift bridge, again named simply the Steel Bridge. In 1913 the Broadway Bridge was completed. This was Portland's first bascule bridge. It was the last bridge built in Portland with streetcar tracks and the last bridge built by the city of Portland. In 1913 the Oregon state legislature made bridgebuilding across the Willamette River in Portland the responsibility of Multnomah County.

The bridges of this second wave were made of heavy steel construction, reflecting America's burgeoning steel industry of the time. The Hawthorne, Broadway, and Steel Bridges were built so durable that they still operate today. The Broadway was built to serve the streetcar neighborhoods of northeast Portland. Its effect was to help stretch the city's downtown business district westward.¹⁰

1925-1931

By the 1920's Portland's population was booming--its automobile population, that is. In 1916 there were 10,000 registered automobiles in the city. By 1920 that number more than tripled to 36,000, and by 1929 it tripled again to 90,000. By 1924 Portland voters authorized \$6 million for building three new bridges to handle this traffic. That year 75 percent of all Portlanders lived on the east side, and in 1925 130,000 vehicles crossed Portland's bridges each day.¹¹

The first two of these bridges--the Sellwood Bridge (1925) and the Ross Island Bridge (1926)--were the first bridges built across the Willamette River at Portland that did not move. Both spans, located far south of the other Portland bridges, were high enough to enable fixed spans to be built. In 1926 a bascule bridge replaced the slow-opening Burnside Bridge, which had been damaged by flood in 1923. In 1928 voters approved \$4.2 million to build the St. Johns Bridge. This was the first suspension bridge at Portland. Located far to the north of previous Portland bridges, it connects the districts of Linnton and St. Johns.

This third wave of bridges was designed to improve access for automobiles from the residential east side to the business west, and also to help traffic get around the center of downtown. The four-lane Ross Island Bridge and the six-lane new Burnside Bridge served a high volume of traffic. They helped facilitate further growth of Portland's east side. The Sellwood bridge was built with only two lanes for reasons of economy, and its effectiveness was diminished. Just as the Broadway Bridge had stretched the downtown business district to the northwest, the Ross Island and Sellwood bridges pulled it southward. The St. Johns Bridge did not have a similar effect. Author Carl Abbott calls the St. Johns Bridge a mistake, pointing out that it served only two small communities and never carried more than 3 percent of Portland's bridge traffic in the 1930's. When the bridge was completed, the city had no money left to start on another bridge planned for a more useful location closer to city center.¹²

CONCLUSION

Portland historian E. Kimbark MacColl has stated that "of all the economic forces that effected the physical shaping of Portland and its metropolitan region, the land transportation industry has had the greatest single impact." Surely Portland's early bridges played an essential role as transportation links. The first bridges served the eventual unification of the three communities on the banks of the Willamette River into one city. During the streetcar era Willamette River bridges connected the lines which facilitated the city's rapid growth. Several bridges--the Ross Island, the Sellwood, the first Morrison, and Broadway bridges--not only aided growth but also shaped the downtown as well.¹³

ENDNOTES

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2. E. Kimbark MacColl, The Shaping of a City: Business and Politics in Portland, Oregon 1885-1915, (Portland: The Georgian Press Company, 1976), pp.118-121; and Abbott, Portland: Planning Politics and Growth, pp.53-55.
3. MacColl, The Shaping of a City, pp.129-131.
4. Abbott, Portland: Planning, Politics and Growth, p.55; and MacColl, The Shaping of a City, p.95.
5. Oregon Department of Transportation, Environmental Section Records, "Engineering Antiquities Survey," April 1987, B-2; and Abbott, Portland: Planning Politics and Growth, p.98.
6. E. Kimbark MacColl, Merchants, Money, and Power: The Portland Establishment 1843-1930, (Portland: The Georgian Press, 1988), p.265; MacColl, The Shaping of a City, p.145; and ODOT, Environmental Section Records, "Engineering Antiquities Survey," April 1987, B-2.
7. Sharon Wood, "Burnside Bridge Helped Usher in the Age of Automobile," Oregonian, (16 April 1984), B-5; and MacColl, The Shaping of a City, p.154.
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9. E. Kimbark MacColl, The Growth of a City: Power and Politics in Portland, Oregon 1915 to 1950, (Portland: The Georgian Press, 1979), p.103; MacColl, The Shaping of a City, 112; and Abbott, Portland: Planning Politics and Growth, pp.33, 57.
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11. Abbott, Portland: Planning, Politics and Growth, p.93; and MacColl, The Growth of a City, pp.259-260.
12. Abbott, Portland: Planning, Politics and Growth, pp.99-100.
13. Abbott, Portland: Planning, Politics and Growth, p.98; and MacColl, The Growth of a City, p.97.