

In(to) the Loop

BY JIM TALBOT



The oldest of the Chicago Loop's working bridges paved the way for a new generation of bridges for the city, and is the first to turn 100.



STEEL CENTURIONS SPANNING 100 YEARS

Our nation's rich past was built on immovable determination and innovation that found a highly visible expression in the construction of steel bridges. The Steel Centurions series offers a testament to notable accomplishments of prior generations and celebrates the durability and strength of steel by showcasing bridges more than 100 years old that are still in service today.

CHICAGO'S WASHINGTON BOULEVARD BRIDGE, which crosses the South Branch of the Chicago River, was the first bascule bridge to make use of innovative design improvements patented by Chicago bridge engineer Alexander Von Babo. It turned 100 on May 26, making it the oldest of Chicago's Loop bridges that still move.

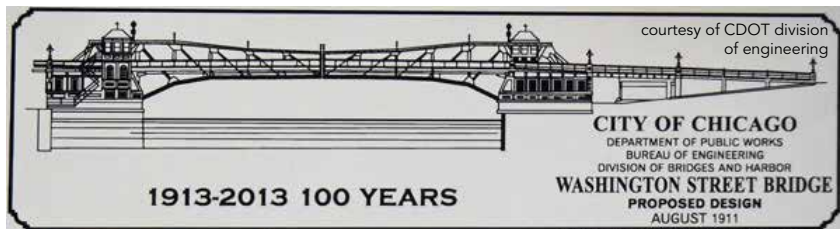
About 700 people attended the centennial celebration, taking advantage of a free day at the McCormick Bridgehouse and Chicago River Museum and also taking home commemorative magnets. A nearby bridge of similar design, the Chicago Avenue Bridge, may soon suffer demolition and replacement. If so, the Washington Boulevard Bridge's preservation becomes that much more important.

Innovative Engineering

Von Babo immigrated to the United States from Germany in 1886. In 1911 he secured his patent that led to what's known as the second generation of Chicago's trunnion bascule bridges, during which he and others with the Chicago Bureau of Engineers greatly improved bascule trunnions (the fulcrums that balance the movable bridge leaf with its counterweight). Bascule counterweights ("bascule" derives from the French term for seesaw or balance) dramatically reduce the energy needed to raise and lower the bridge leaves.



- ▲ Several bridges preceded the Washington Boulevard Bridge at the same site, as did a tunnel.
- ◀ Bascule bridges employ counterweights to minimize the energy needed to lift the bridge leaves.



- ▲ A magnet commemorating 100 years of service by the Washington Boulevard Bridge.
- ▼ A Pratt truss has diagonals that slope toward the center vertical. Pony trusses have no top bracing.



These improvements made the fixed trunnion bascule bridges more economical than earlier designs—and also greatly changed their appearance. The new designs represented the transition from the lighter-weight and less streamlined designs toward the smoother and more massive designs.

A key feature of the new design was the location of the bascule's rack and pinion. In the first generation Chicago bascules, the location was outside of the truss, which proved to be a design limitation; moving the rack and pinion to the inside of the truss solved this problem. So, city engineers began making use of the new design throughout most of the remaining history of bascule bridge construction in Chicago, and the new design was so successful that it achieved national attention and influence.

Technically, the bridge is a trunnion bascule, double-leaf, Pratt pony truss. The term "pony" means the superstructure contains no top cross-bracing—so the bridge has no height restrictions. A Pratt truss includes vertical members with diagonals that slope downwards toward the center vertical. The span between trunnion centers of the Washington Boulevard Bridge runs 197 ft, and the total

structure length is 303 ft. The bridge deck is 36 ft wide and provides 21 ft of clearance above the water.

During its first full year of operation, in 1914, the bridge opened 3,773 times. Today it's raised about 40 times a year for sailboat runs to and from Lake Michigan, and about 14,000 vehicles and 9,500 pedestrians still cross it every day.

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Bridge photos are courtesy of www.historicbridges.org and its author/photographer/webmaster

Nathan Holth (nathan@historicbridges.org). Holth is also the author of *Chicago's Bridges*, which includes photography and discussion of Chicago's movable bridges, including the Washington Boulevard Bridge.



Innovative Construction

Back in 1869, long before the bridge was conceived, the city built a tunnel under the river at what would become the site of Washington Boulevard crossing. The tunnel served wagon and pedestrian traffic, and it even provided an escape path during the Great Chicago Fire of 1871 (residents could avoid the burning bridges). Later the city converted the tunnel for cable and street car systems.

The first bridge to cross the river at this point was an 1875 iron swing bridge. In 1891, the city removed that bridge and relocated a swing bridge from nearby Madison Street to the site. This swing bridge was dismantled in 1907 to make way for the lowering of the tunnel by 9 ft (larger vessels were striking its roof) and for the construction of the new bridge.

The city closed the tunnel in 1953, but substructure construction for the new Washington Boulevard Bridge still had to deal with it. Work began on the substructure in August of 1911 and was completed in about a year. The contractor, Fitzsimmons and Connell Dredge and Dock Co., first sank concrete cylinders on either side of the tunnel. Then workers essentially built a concrete box atop the cylinders, reinforced with steel trusses, and the concrete box straddled the tunnel without put-

ting any load on its roof (these foundation design techniques were later used in similar bridge projects). Work on the superstructure by the Strobel Steel Company began in June of 1912. Workers lowered both leaves into position simultaneously in March of 1913, and pavement and sidewalks followed.

The Washington Boulevard Bridge was the first of Chicago's movable bridges to add aesthetic touches and upgraded materials for the bridge houses, abutment walls, railings and lighting. Its bridge houses, for example, boasted more ornamentation as well as cladding of molded copper sheeting. These aesthetic touches added about \$14,000 to the total \$238,000 cost of the bridge. Today, based on original plans, the bridge is missing decorative finials that were mounted on top of the trusses at various panel points, but the overall look remains the same 100 years later.

Credit for the longevity of Washington Boulevard Bridge and the rest of Chicago's movable bridges goes to the Chicago Department of Transportation crews that operate and maintain them. CDOT conducts biannual inspections, annual power washing and painting at least once every 10 years. This bridge is now eligible for the National Register of Historic Places. **MSC**