



DSI References

Reference Details

Owner Transport Authority Chicago City, Chicago, IL, USA +++ **General Contractor** James McHugh, Chicago, IL, USA +++ **Architects** Muller & Muller, Chicago, IL +++ **Technical Advice** URS, Chicago, IL, USA +++ **Engineers** HNTB, Chicago, IL, USA

DSI Unit DSI USA, BU Post-Tensioning, Bolingbrook, USA
DSI Scope Supply of DYWIDAG Post-Tensioning Systems types 5x0.6" and 19x0.6", design and supply of 24 DYNA Grip® Stay Cables 23x0.6



New Combination of Suspension and Cable-Stay Bridge with DSI Systems

Construction of North Avenue Bridge, Chicago, IL, USA

The existing North Avenue Bridge over the Chicago River was built in 1907 as one of the famed Chicago-style trunnion bascule bridges. In recent years, traffic jams were frequent on the bridge due to the narrowing of the street into one lane in each direction. To reduce this congestion, the city of Chicago decided to build a new bridge.

The new bridge uses the same alignment, with two lanes of traffic in each direction, and has a 77m long main span and two side spans of 26m each. The modern architectural design of the 129m long bridge includes both characteristics of a suspension and of a cable-stay bridge. Since the new bridge uses the same alignment, the project included erecting a temporary bridge on a different alignment before demolition of the old bridge could begin.

Several location factors required the construction of the 77m long main span as self anchored suspension bridge. In this design, the horizontal component of tensile force in the suspension cables is transferred as a compressive force into the concrete deck slab. The forces from the vertical hangers are transferred into separate anchor blocks. Since this method requires a strong bridge beam, the 77m long main deck was post-tensioned with high strength 19x0.6" DYWIDAG Strand Post-Tensioning Systems. DSI USA supplied these post-tensioning systems from its factory in Bolingbrook near Chicago.

Both of the 26m long side spans including the steel pylons were constructed as a cable-stayed bridge. The stay cables were also supplied by DSI USA. They are sheathed in polished stainless steel, which simultaneously offers efficient corrosion protection and fits in very well with the bridge's aesthetics. For the new North Avenue Bridge, DSI USA designed and supplied a total of 24 23x0.6" DYNA Grip® Stay Cables.

The hybrid design permits elegant aesthetics through slender elliptical steel pylons and stiffens the superstructure while limiting its depth to less than 1.2m. This was key in providing the minimum clearance required by the US Coast Guard.

The new bridge was opened to traffic prior to Christmas 2007, adding extra Holiday Cheer in Chicago. Now, the light design of the new bridge opens up unrestricted views of Chicago's skyline which had been obstructed by the hefty beams of the old bridge.

The first-time combination of suspension and stay cable technique bestows a high degree of attention on the new North Avenue Bridge. The bridge offers the opportunity to inspect this innovative architectural design closely in order to gain valuable insights into future applications of its technique.

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