



I-64 Kanawha River Bridge

Location:	Kanawha County, WV
Submitted by:	T.Y. Lin International
Owner:	West Virginia Department of Transportation, Division of Highways
Architect(s):	N/A
Engineer(s):	T.Y. Lin International
Contractor:	Brayman Construction Corporation
PT Supplier:	VSL
Other Contributors:	Concrete Supplier: Arrow Concrete; Formwork for Cast-in-Place Segments: STRUKTURAS; Bearings: R.J. Watson, Inc.; Expansion Joints: Watson Bowman Acme Corporation; and Prepackaged Grout: BASF

Project Overview:

The innovative Kanawha River Bridge is a record-setting, low-cost, durable, and aesthetically pleasing post-tensioned box girder structure built as part of the I-64 Widening Project in Kanawha County, WV. The bridge carries I-64 eastbound traffic consisting of three through lanes, one auxiliary lane, and shoulders. The overall bridge length is 2975 ft, including a record 760 ft main span. The superstructure was built using the balanced cantilever construction method with cast-in-place segments supported by form travelers. Bridge construction was completed ahead of schedule, and the structure was opened to traffic for the first time on July 31, 2010.

The bridge designers were confronted with the challenge of designing a 2975 ft long eastbound structure for the new alignment. The requirement to locate the main piers outside the main channel of the Kanawha River dictated a 760 ft main span. The span arrangement studies included five different alternatives for this river crossing: concrete box girder, steel tied arch, steel box girder, concrete cable-stayed, and steel truss. The post-tensioned box girder and steel arch alternatives were selected for the Type, Size, and Location Study. Detailed evaluations of these bridge types considering aesthetics, constructibility, cost, and maintenance requirements resulted in the selection of the post-tensioned concrete box girder alternative for the final design.

The owner later decided to use competitive bidding of the already-designed concrete bridge alternative versus a new steel bridge alternative. Contract plans for a steel bridge alternative consisting of a steel box girder superstructure with the same span arrangement as the concrete alternative were developed. The low bid was the post-tensioned concrete box girder alternative. The bid price for the post-tensioned concrete alternative was \$82.9 million, \$30 million less than a competing steel alternative. Considering bridge items only, the bid price of the post-tensioned concrete bridge was \$75 million. This represents an average cost of \$379 per ft², a very competitive cost considering the long bridge spans.

The Kanawha River Bridge has resulted in significant benefits to the Charleston area. During construction, the extensive use of local materials and labor boosted the local economy. Environmental and public impact were minimized by the use of post-tensioning and cast-in-place long-span balanced cantilever construction. The use of post-tensioned concrete and the expected long design life bring significant sustainability benefits. With the completion of the project, traffic congestion and the pollution associated with congestion have been minimized. The new improved alignment has also enhanced traffic safety.

Jury Comments:

- Project demonstrates the cost effectiveness of post-tensioned segmental box girder construction.
- An aesthetically pleasing structure that fits in well with the local surroundings despite its size.
- The use of PT provided flexibility in both design and construction to accommodate for main span deformations, making the geometrically complicated "S-curve" alignment possible.