

Pennsylvania Turnpike Commission

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Typical reinforced concrete rigid frame bridge built in the 1930s. Preservation of this bridge was completed in 2010. All photos: Pennsylvania Turnpike Commission.

From the time the Pennsylvania Turnpike was constructed in 1940, the use of concrete has been instrumental in the construction of its bridges. Always considered the original signature bridge of the Pennsylvania Turnpike, the reinforced concrete rigid frame bridges are still providing safe passage for the traveling public after more than 70 years.

The use of concrete is still prevalent today as the Commission is in the midst of their most ambitious statewide reconstruction initiative in their history with more than 90 miles of Pennsylvania Turnpike already reconstructed, more than 20 miles currently under construction, and more than 150 miles currently in design. The program is the first complete restoration of the toll road since it was built and includes the addition of a third lane in each direction. The complete replacement of all overhead and mainline bridges is a part of this restoration with a number of the structures being replaced with prestressed concrete beams. This expansion is needed to accommodate the more than 186 million vehicles per year that travel the Pennsylvania Turnpike's 545 miles of roadway.

Recently the Commission completed a number of major bridge crossings that were all constructed with concrete. Three of these significant river crossings utilized segmental construction and are now considered the modern day signature bridges of the Pennsylvania Turnpike. These three successful projects are indicative of the advantages that can be provided by segmental concrete bridges: longer spans that provide a reduced substructure footprint and minimized environmental impacts, as well as shorter construction

durations which minimize inconveniences to the tollway's customers.

The Susquehanna River Bridge, the state's first vehicular segmental concrete bridge, opened in 2007. The mile-long structure provided a variety of benefits, including speed of erection and a construction approach that provided little disruption to the constricted site. The design features twin structures, each 5910 ft long and 57 ft wide, with precast concrete, segmental spans that are typically 150-ft long and were erected using the span-by-span method.

The Allegheny River Bridge, near Pittsburgh, was Pennsylvania's first cast-in-place, balanced cantilever bridge. Completed in 2010, the twin



The Susquehanna River Bridge was Pennsylvania's first vehicular segmental bridge.



The Allegheny River Bridge was completed in 2010 and is the state's first cast-in-place, balanced cantilever bridge.

2350-ft-long parallel structures feature six spans, the longest of which is 532 ft. Using traveling forms, the bridge was cast-in-place using the balanced cantilever method, working from the tops of the piers.

The Monongahela River Bridge completed in 2012, is part of an extensive expansion to the Mon/Fayette Expressway and spans the Monongahela River near Brownsville, Pa. The 3022-ft-long bridge features seven spans, the longest of which is 518 ft. The structure was built using the balanced cantilever method. The concrete segments consist of 89-ft 4-in.-wide, dual-cell box girders with a three webs. This configuration was chosen due to the width of the structure, which consists of four lanes and a median.



The slender superstructure of the Monongahela River Bridge compliments its 200-ft-tall piers.

Finally, in the fall of 2011, the Pennsylvania Turnpike opened to traffic its twin bridges spanning the Lehigh River and Pohopoco Creek in Carbon County, which all utilized prestressed concrete bulb-tee beams. The 1539-ft-long Lehigh River structures consist of 10 spans with lengths reaching 168 ft, which were the longest prestressed concrete bridge beams to be fabricated in Pennsylvania. The 1020-ft-long Pohopoco Creek structures consist of seven spans with lengths reaching 158.5 ft.

It is expected that concrete structures will continue to play a significant role as the Commission goes forward with the management of their bridge program. **A**

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