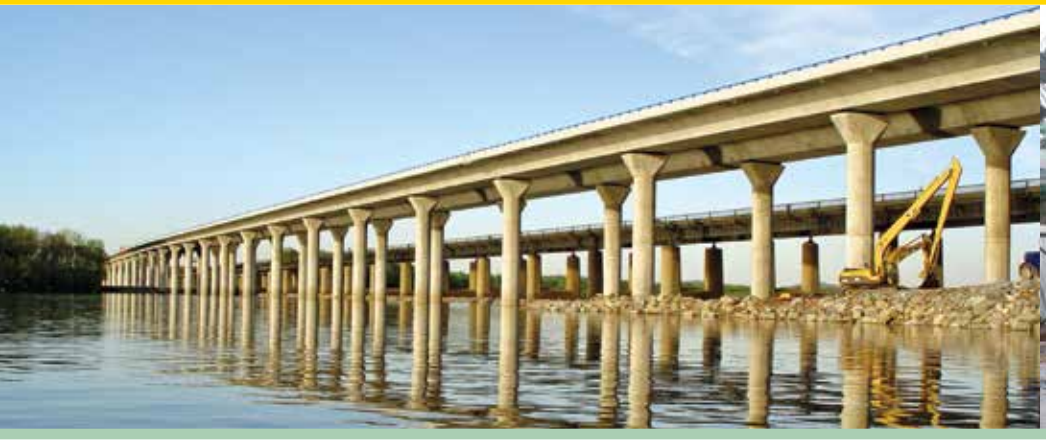
Susquehanna River Bridge (I-76)

Pennsylvania Turnpike, PA



Structural Framing System

The Commonwealth of Pennsylvania's first vehicular concrete segmental bridge opened to traffic in June 2007 after two years of construction, during which it provided users of the existing bridge with front row seats to observe cast-in-place construction of the piers and erection of the precast concrete superstructure on the adjacent alignment. The twin 5,910' long structures feature 150' typical spans that were erected span-by-span with delivery of typically 100 ton segments over the completed portions of the bridge, minimizing construction activities in the river. A nearby yard was created to cast the 1,040 segments in the short line casting method. Foundations are drilled shafts. The twin bridges cross the shallow, non-navigable Susquehanna River,in addition to rail lines, a state roadway and Culver Island. A temporary causeway that was constructed in the river on the eastern side of Culver Island, then shifted to the west side and the structures completed from Culver island to the western shore.

Unique Structural Design Features

Susquehanna River Bridge is the longest bridge in the Pennsylvania Turnpike system and in close proximity to the Turnpike headquarters. Turnpike staff members refer to it as their first signature bridge and take great pride in the unique appearance of the bridge. A form liner used during the casting of piers molded a stone inlay that reflects the quarried limestone façade of the Headquarters building. The form liner created a ribbon of texture vertically up the center of the pier, visually adding to the pier slenderness. At the top of the pier, the limestone texture splays across the pier cap in the shape of a keystone, honoring Pennsylvania, the Keystone State. During construction, the bridge was instrumented with strain gauges to obtain data to compare the actual strain performance of the bridge with design results.

Why Reinforced Concrete

Susquehanna River Bridge was bid in October 2004; low bid was $82 million/approximately $120 per square foot of bridge deck historical Pennsylvania bridge costs at the time of the bid. Initial Turnpike studies indicated that renovating the 50-year old existing bridge would have been nearly as expensive as constructing a new bridge, however, would have negatively impacted traffic, potentially reducing toll revenue. Concrete segmental technology offered the shortest construction duration of major bridge types, a significant advantage. By constructing the new bridge on a parallel alignment, users on the Turnpike were not inconvenienced. The new bridge was designed to last for 100+ years with minimal maintenance.

Team

Owner:
Pennsylvania Turnpike Commission

Designer:
FIGG

Construction Engineering Inspection:
FIGG

General Contractor:
Edward Kraemer,
G.A. and F.C. Wagman, (a Joint Venture)

Design Criteria:
– Create the longest bridge in the Pennsylvania Turnpike system.

– Designed to last for 100+ years with minimal maintenance.

Total Project Cost:
$82 million

Total Size:
LENGTH: 5,910 feet (twin bridges)

Photography:
Art & Architecture Photography