Bootstrapping Up

The New Jersey Turnpike Authority gets its feet wet with its first precast, post-tensioned concrete bridges over coastal waterways

by William Wilson, New Jersey Turnpike Authority

The New Jersey Turnpike Authority (NJTA) is a major toll road agency in the northeast that operates the two largest roadway facilities in New Jersey; the Garden State Parkway and the New Jersey Turnpike. The NJTA's facilities are undergoing an expansive improvement program to better serve a growing population and support increasing traffic to the vibrant coastal resort communities in the region.

This program addresses the aggressive environmental conditions of New Jersey's southern coastal region, where bridges are subjected to salt water spray and repeated deicing salt usage. These conditions have taken their toll on the roadway over its 60-year service life, and bridges over the most exposed waterways warranted replacement. From this program emerged three challenging new bridge projects for which precast, prestressed, post-tensioned concrete girder superstructures were ultimately chosen: the 1230-ft-long Mullica River Bridge, the 900-ft-long Bass River Bridge, and finally the 3834-ft-long Great Egg Harbor Bridge. Prior to these bridges, the NJTA had limited experience with this type of structure. Each project was a step forward for the NJTA in understanding the bridge type and culminating in three state-of-the-art concrete bridges.

Going in Head First

The NJTA's first two experiences with long-span concrete bridges came in the form of the Mullica and Bass River Bridges.

Precast, prestressed concrete was determined to be the preferred alternative in order to reduce future maintenance concerns that go along with painted steel in an aggressive environment. Given the cost and complexity of the pier construction, along with a limited timeframe for in-water construction due to environmental concerns, spans up to 220 ft were chosen to eliminate as many piers as possible. These large spans were made possible through the use of precast, prestressed and post-tensioned, AASHTO Type VI, modified concrete girders composed of haunched pier segments with drop-in spans and fully spliced with draped post-tensioning strands. The resulting continuous structure for Mullica was one of the longest precast, prestressed, post-tensioned spliced concrete girder units in the nation and was subsequently featured in the Fall 2012 issue of *ASPIRE*.™

Next: Great Egg Harbor

Looking to the future, the NJTA intends to add another long-span concrete bridge traversing the Great Egg Harbor with a 3834-ft-long, 21-span structure with multiple continuous span units, using bulb-tee girders with haunched pier sections and spliced drop-in segments. Span lengths will vary from 148 ft to as long as 250 ft over the navigable channel, making it the longest precast, prestressed, post-tensioned concrete span in the NJTA's inventory.

The completed Mullica River Bridge. Photo: Parsons Brinckerhoff.

Summary

Precast, prestressed, post-tensioned concrete, once an exotic superstructure choice in the northeast, has become an increasingly popular choice among bridge owners seeking to reduce long-term maintenance costs in harsh environments. The NJTA has chosen to stretch convention in the region with challenging bridge designs for challenging infrastructure solutions. A

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Aerial view of the Bass River Bridge. Photo: Hardesty & Hanover.