

CREATIVE CONCRETE CONSTRUCTION

by Steven Hodgdon,
Vanasse Hangen Brustlin Inc. (VHB)

The First Northeast Extreme Tee (NEXT) BEAM BRIDGE

The first Northeast Extreme Tee (NEXT) Beam bridge, located in York, Maine, opened to traffic in November 2010. The bridge, which replaces a deteriorated, 17-span steel girder bridge constructed in 1957, is located on Route 103 and crosses the York River near the Atlantic Ocean. The continuous bridge consists of two 55-ft-long end spans and five 80-ft-long interior spans. Each span uses four 36-in.-deep NEXT beams, 9 ft 4½ in. wide that are butted together edge-to-edge. The top flange is 4 in. thick and provides the form for the 38-ft 2-in.-wide, 7-in.-thick cast-in-place composite concrete deck. The bridge is supported by steel pipe pile pier bents and integral abutments.

The NEXT Beams were fabricated by Dailey Precast of Shaftsbury, Vt., and the bridge was constructed by CPM Constructors of Freeport, Maine. The NEXT Beam is similar to a standard double-tee beam except the stems are wider (15 in. at the top tapering to 13 in. at the bottom for this project) to accommodate bridge design loads. This beam cross section was developed by the Northeast Chapter of PCI (www.pcine.org) as an alternative to adjacent box beams in the 45-ft- to 90-ft-span range to accommodate accelerated construction of bridges. The beam depths may be varied from 24 in. to 36 in. and the top flange width may be varied from 8 ft to 12 ft to meet specific span and width requirements. Sections are available that include a full-depth deck for ride-direct or noncomposite applications.

Sustainability was an important element in the design of the bridge. Several features enhance durability, longevity, and minimize future maintenance. The steel pipe piles are coated with a fusion-bonded epoxy coating and equipped with cathodic protection elements. The steel pipe piles are also designed for up to 50% future section loss and the inner core is filled with reinforced concrete. There are no joints or bridge drains. The deck is constructed with epoxy-coated reinforcing steel and is covered with a high-performance waterproofing membrane and 3-in.-thick bituminous wearing surface. Self-consolidating

concrete for the NEXT beams included calcium nitrite to inhibit corrosion. In addition, the navigational lighting on the bridge uses solar power.

Steven Hodgdon is project manager with Vanasse Hangen Brustlin Inc. (VHB) in Bedford, N.H.

Epoxy-coated reinforcement extending from the cast-in-place concrete deck provided for the negative moment over the piers.



Beams were erected with a crane from jack-up barge on the York River.

Beams were made continuous over the piers and integral with the abutments. All photos: VHB.

