Longest Precast Bridge in the U.S. Using Post Tensioned Splice Girders

Middlebury, Vermont’s Cross Street Bridge, opening for traffic this month, consists of a middle span of 240 feet and two end spans of 120 feet each. The approach spans each consist of ten 42” deep box beams 4’ wide by 120 feet long. Transportation of the largest girders through Middlebury also required the installation of a temporary precast bridge over a structurally deficient state bridge structure.

The center span is made of five 3000mm NEBT x 240’ clear span spliced girders with a modified 10” thick web. Each girder line is comprised of two 65’ end segments and one 108’ center segment, with 2’ wide splice joints. Each girder has five 4” dia. P/T ducts, three with (22) 0.6” strands and two with (19) 0.6” strands. The bridge has an 8” concrete deck plus 3” of pavement.

The Design Build Team for this low maintenance bridge consisted of Kubricky Construction Corp, J.P. Carrara & Sons, VHB Pioneer, and the Town of Middlebury. The bridge was funded without any state or federal money; it is financed by a local option tax of one percent on sales combined with 30 years of bond payments made by Middlebury College.

Thanks to Mike Weigand of J.P. Carrara & Sons for this story and these photos, and for a link to the PCINE Website, which also carries an article on this incredible structure (and from which we borrowed a few facts—thanks to Rita Seraderian).

Carrara also furnished 26 precast pilasters with an exposed aggregate accent feature. The ‘grand opening’ is scheduled for October 30.

(continued on page 3)
New England’s First NEXT Beam For ABC Replaces 17 Span Steel Bridge, York Harbor

(NEXT - Northeast Extreme Tee Beam for ABC - Accelerated Bridge Construction)

The NEXT Beam was developed as a new standard by the bridge technical committee of PCI Northeast. The committee which is a public private partnership of State Highway Departments, Area Precasters, and Private Consultants, covers the six New England States and New York. The new section was proposed in concept by Rita Seraderian to the bridge technical committee in October 2006. The goals of this new section are to provide a fast construction option for variable width bridges with median spans between 45 to 90 feet. The section resembles a standard double tee except that the stems are wider to handle moment and shear demand for bridge loads. The top flange of the beam is thin and is designed to provide formwork for a cast-in-place concrete deck, which has been shown to save substantial time during construction.

The new 510’ bridge was built with only 7 spans – 2 end bays of 55’ and 5 center bays of 80’. Some of the challenges of the new structure were to maintain the existing profile and navigational clearances, and avoid conflicts with existing substructure locations. The NEXT Beam solution provided an additional 4” of navigational clearances.

The beam’s top flange is designed to support the weight of the 8” cast in place concrete deck, eliminating installation and stripping of formwork on site. Diaphragms are typically used with stringer bridges, to provide live load distribution and lateral support of the top flange so that lateral torsional buckling of the flange is prevented. The top flange/concrete deck combination provides sufficient live load transfer among beam stems; there are no intermediate diaphragms required. End diaphragms are used to support the unstiffened slab edge at the supports. All of these features enable a fast construction process. Another advantage of the tee shape is that it allows utilities to be run between the long stems, making it easier for both inspections and repairs.

(continued on next page)
Longest Precast Bridge in the U.S. (continued from page 1)

80’ beams being removed from delivery trucks, placed on a barge for relocation to intermediate spans, and then directly swung into place.

Tees bear on combination steel/neoprene pads.

Preparing for composite end diaphragms.

Curing of 8” top slab and sidewalk pour.

Project credits go to contractor CPM Constructors, engineer Vanasse Hangen Brustlin, Inc., Bedford, NH, and Precaster Dailey Precast, Shaftsbury, VT. Our thanks for this story to Lee Edwards, Bob Wilcox, and Eric Schaffrick at Dailey. Thanks and credit also to Rita Seraderian, PE, PCINE Executive Director, and for the Summer 2010 PCI Journal article, “Development of the northeast extreme tee (NEXT) beam for accelerated bridge construction”, by Michael P. Culmo, P.E., CME Assoc., and Rita L. Seraderian, P.E., LEED AP, PCINE.

Girders and decorative precast medallions.

Photos by Dailey Precast, Shaftsbury, VT.
**Associates Corner — I35 Bridge Replacement Project, Minneapolis, MN**

The major structure to replace this failed bridge has been well publicized, but the project also incorporates a watertight pedestrian underpass under the new bridge, requiring products of the highest water-tight integrity.

ConSeal products were used to provide the watertight seal between box culvert sections. CS-102 Butyl Rubber Sealant was used to seal the interior section of the joints and CS-212 External Joint Wrap was used on the exterior, along with CS-75 Water-Based Primer to ensure a secure seal.

Thanks to Ed Pennypacker, Concrete Sealants, Inc. for sending this information.