Van Zandt Hollow Bridge Over Glen Creek

A New York State Department of Transportation biennial bridge inspection in May 2009 brought about a red flag for the Van Zandt Hollow Bridge over Glen Creek in the Town of Dix, Schuyler County, New York due to cracked and deflected longitudinal deck boards. The existing six-span timber bridge was built in 1977 on this two-lane local road, and was posted as having a fifteen-ton weight limit in 1994.

County officials were faced with the prospect of having to close the bridge during racing season when thousands of race fans visit nearby Watkins Glen International racetrack. Schuyler County asked Hunt Engineers, Architects and Land Surveyors, PC to design a temporary repair in order to keep the bridge open during the peak of race season and then to design a replacement structure to be built in the off season.

The new bridge replaces the six-span timber structure with a single-span prestressed concrete adjacent box-beam bridge on spread footings founded on rock. The single-span replacement bridge improves the hydraulics at the site and decreases debris accumulation that was a problem with the existing bridge. Appropriately sized rip-rap protection also helps prevent scouring of the existing rock.

An adjacent box beam structure was chosen for ease of construction and cost effectiveness for the span length. The beam length is 90 ft. c/c bearing, with a beam depth of 33 in. The beams were produced by Jefferson Concrete Corporation with construction performed by Silverline Construction. The mix design and concrete strengths for the beams were in accordance with NYSDOT criteria, and had an f’c = 10 ksi. A 6” composite concrete deck was used, rather than an asphalt wearing surface placed directly over the beams. A composite concrete deck helps to alleviate some of the problems that were experienced elsewhere on bridges of this type with only an asphalt overlay, such as post-tensioning strands failing due to water leaking between the beam joints.

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Van Zandt Hollow Bridge (continued from page 1)

Ensuring the availability of materials and labor as well as using special construction techniques such as cold-weather concreting allowed the project to be successfully completed during the off-season. The new bridge was opened to traffic in 2010. Construction cost for this bridge was approximately $575,000. Our thanks go to Cristina L. Brush, PE, HUNT Engineers, Architects, & Land Surveyors, P.C. for this article and accompanying photos.

Up Close with Ultra-High Performance Concrete

Ultra-high performance concrete (UHPC) is a fiber-reinforced cementitious composite material that exhibits mechanical and durability properties far exceeding those traditionally associated with structural concrete. These superior properties include exceptional durability, high compressive strength, usable tensile strength, and long-term stability. To date, UHPC has been used in five bridge reconstruction projects in three States, with more projects on the way. Applications have included using UHPC as a joining material for modular bridge components, in structurally optimized prestressed girders, and in optimized precast deck panels. (see July 2010 Focus at www.fhwa.dot.gov/publications/focus/10jul/05.cfm)

With Prefabricated Bridge Elements and Systems (PBES), many time consuming construction tasks no longer need to be done sequentially in work zones. An old bridge can be demolished while the new bridge elements are built at the same time off-site, then brought to the project location ready to erect. Because PBES are usually fabricated under controlled climate conditions, weather has less impact on the quality, safety, and duration of the project. The use of PBES also offers cost savings in both small and large projects. The ability to rapidly install PBES on site can reduce the environmental impact of bridge construction in environmentally sensitive areas.
A Vital Link Between Pennsylvania and New York

Located in rural Susquehanna County, Pennsylvania, S.R. 1015 over Cascade Creek carries traffic along the east side of the Susquehanna River and is a vital link between Pennsylvania and New York for both local and commercial traffic. The bridge consists of four prefabricated bridge units set on neoprene bearing pads. The curb along each fascia was cast integrally with the bridge units prior to delivery, allowing the contractor to install the guide rail immediately upon the bridge units being placed. This project was led by PADOT under the design/build initiative with the contractor and designer focused on providing a high quality solution that had a minimal impact to the traveling public. The majority of the construction was done in June 2010 and installed in two stages to allow traffic to flow with minimal disruption.

The main focus of the contractor and designer was to minimize the disruption to the traveling public. This was realized, as all four prefabricated bridge units were set in less than one hour total accumulated time. The finished product provides a quality product with minimal maintenance for the lifetime of the bridge. The painted beams help the structure blend in with its surroundings.

The beam span is 39'-3", and each piece weighed 26 tons. The structural depth was 29", composed of a 21" deep steel beam with 8" of concrete deck. Note in the photo that precast edge curbs were cast with the deck units prior to delivery with railing anchor plates already installed. The bridge is owned by the Pennsylvania Department of Transportation; project contractor was Minichi Contracting Group; Engineer was Dewberry-Goodkind, Inc; precast units supplied by The Fort Miller Co., Inc; with our thanks to Scott Harrigan of The Fort Miller Co. for this article and the photos.
On February 16, CNYC ACI meeting, Dr. Ken Hover, Professor of Civil & Environmental Engineering, Cornell University, gave a most educational and stimulating talk entitled “Twins Separated at Birth”, referring to the concrete in the cylinders and the concrete in the actual structure. This quote was memorable: “The best way to make a small fortune in the concrete industry is to start with a large fortune.”

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