

CREATIVE CONCRETE CONSTRUCTION

167-ft-long precast concrete beams avoid obstacles along PENNSYLVANIA TURNPIKE

by Troy M. Jenkins, Northeast Prestressed Products LLC

As part of the Pennsylvania Turnpike Northeast extension in Carbon County, twin bridges were designed to span the Lehigh River and Lehigh Canal with one set of 1530-ft-long structures, while a second set of 1020-ft-long bridges spans the adjacent Pohopoco Creek. The geometries of these locations were complex, as a variety of constraints stood in the way. The obstacles included railroad tracks, a state road, the historic canal, and the two waterways.

The original design was conceived as a steel structure, but the Pennsylvania Department of Transportation (PennDOT) allows for a contractor-designed alternate. The engineers at Northeast Prestressed Products LLC (NPP), Cressona, Pa., saw an opportunity to create a precast, prestressed concrete bridge that would offer the benefits of faster construction, greater economy, and lower maintenance costs throughout the structure's life.

To accomplish this required 175 precast concrete PennDOT bulb-tee beams, ranging in length from 100 ft to 167 ft. Many of these needed to be set as chords to achieve the proper radius. Borton-Lawson Inc. in Wilkes-Barre, Pa., consulted on the engineering design for the project.

On the Pohopoco Creek project, 20 of the beams were approximately 163.5 ft long, 20 were 151 ft to 157 ft long, 20 were 137 ft to 141 ft long, and 10 were 100 ft to 102 ft long. On the Lehigh Bridge, 30 beams were 163 ft to 166.8 ft long, 30 beams were 148 ft to 158 ft long, 30 were 129 ft to 138 ft long, and 15 were 100 ft to 108 ft long for a total of 105 beams.

Nothing out of the ordinary was needed to transport the beams to the site. NPP has specialized transportation equipment in its fleet for such deliveries. The beams were tied down and secured to the truck and the vehicle on the trailing end in the normal way. A stability analysis was provided for handling, transportation, and placement of the beams at the site. Only one crane was needed to erect the beams upon their arrival. Walsh Group served as general contractor on the project.

The success of this project indicates that long spans and unusual constraints should not preclude the erection of a precast concrete bridge, which can offer many other advantages in the long run for DOTs nationwide.

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Fifty precast, prestressed concrete beams with lengths greater than 163 ft were required for the bridges and delivered to the site and erected without extraordinary provisions.



Careful selection of span lengths was needed to place piers to avoid impacting the river, creek, historic canal, railroad tracks, and access road.