

# Dual Bridges Keep Historic Integrity in Lebanon, Pennsylvania

by Ben J. Wadsworth, formerly with Dewberry Engineers Inc.



*Shown is the 9th Street Bridge overall elevation. Five precast concrete architectural fascia panels per span were suspended from the exterior beams to mimic the look of an historic arch structure. Photo: Troy Jenkins, Northeast Prestressed Products LLC.*

For many years, Lebanon, Pa., has been inconvenienced due to the railway-system traffic that passes frequently through the city each day. After many public meetings, it was agreed that bridges should be constructed on the 9th and 10th Street routes, which would provide both northbound and southbound passage over the railroad. Considering that these structures would influence the aesthetics and feel of the city, architectural finishes were chosen for this design that mimicked original brick patterns and colors found throughout the historic town of Lebanon.

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The precast concrete fascia panels were designed so that, once in place, they would form



*Trains freely pass through the city, inconveniencing residents no more. Photo: Ben Wadsworth, formerly of Dewberry Engineers Inc.*

a series of arches along each side of the bridge. A formliner and concrete stain were used to give the fascia panels the texture and color to complement the look of the historic surrounding community.

The exterior beams, produced by Northeast Prestressed Products, were specially designed with pockets to provide a recessed support area for the precast concrete architectural fascia panels. In order for the exterior beams to carry the load of the fascia panels safely, the beams had to act compositely with the deck prior to the fascia panel installation. To accomplish this,

the construction of the deck took place in two phases. First, the deck concrete was placed only to the center of the exterior beams, and cured for seven days. Next, the fascia panels were installed. Finally, the remainder of the deck was cast.

The vertical support for the fascia panels consisted of studded, stainless steel plates embedded into the recessed beam pockets. Two studded, stainless-steel structural tubes were cast into each fascia panel. These structural tubes were designed to withstand all vertical loads resulting from the panel's self weight.

To keep the fascia panels plumb and resistant to wind loading, horizontal supports were designed. The horizontal support for the fascia panels consisted of threaded inserts cast into the beam. Slotted inserts, with vertical adjustments, were cast into the fascia panels. The threaded and slotted inserts were connected by stainless steel bolts and bent plates. Due to anticipated

need for field adjustments, the bent plates were designed with horizontal slotted holes to allow for greater construction tolerances.

The 9th and 10th Street Bridges were successfully designed to alleviate the major traffic congestion throughout the city of Lebanon, while still preserving the historic community. 

*Ben J. Wadsworth, formerly with Dewberry Engineers Inc., Fairfax, Va., was structural designer for the project.*