AESTHETICS **COMMENTARY**

by Frederick Gottemoeller

Overpass bridges on freeways have a very limited time to make an aesthetic impression because their "audience" is typically traveling at 55 to 75 miles per hour. From the point at which the bridge is close enough for its components to be discerned (no more than 1500 ft away) to the point at which the bridge is so close that travelers are looking through and beyond it (perhaps 300 ft away), just 10 to 12 seconds elapse. Only the largest elements can be seen from the traveler's perspective. Therefore, making a memorable impression requires visual simplicity.

When overpass bridges are closely spaced, similarity is also very important. While moving at 70 miles per hour, travelers see the six bridges of the Interstate 78 (I-78) Underclearance Project at a rate of about one every 1 minute and 10 seconds. Imagine the aesthetic effect if the bridges' appearances were all different!

The I-78 bridges make their visual impression with only four significant elements:

- The brown concrete bulb tees
- The rough gray form-liner "stone" of the abutment wing walls
- The smooth, gray horizontal band of concrete at the tops of the wing walls, which follows the roadway slab across the bulb tees and visually ties the whole bridge together
- The same gray rough "stone" on the parapet face

At a more detailed level, the designers took the trouble to make sure that the form-liner stone actually looks like a real stone wall. Each stone is stained a slightly different color, which provides visual texture. Plus, at the corners, the same stones and mortar lines appear on each wall face. As a final effective detail, the deepening of the horizontal band at each beam seat nicely frames the bulb tees. For travelers on I-78, these visually simple, elegantly detailed new bridges must represent a significant visual improvement on their three-span predecessors.

Precast concrete beams and deck panels were erected at night, and I-78 traffic was maintained, depending on the specific bridge location, with the use of a ramp around the construction or temporary 15-minute closures of I-78.

The major construction activities required for precast concrete deck panel construction included the following:

- Erection of the precast concrete full-depth deck panels
- Placement UHPC in the transverse joints
- Tensioning and grouting of longitudinal post-tensioning
- Placement of UHPC in the composite reinforcement blockouts, haunches, post-tensioning anchor blockouts, and longitudinal closure pours

Major construction activities to complete construction of a typical bridge included precast concrete sleeper slab and approach slab construction, cast-in-place concrete parapet construction, deck milling, and placement of the latex-modified concrete overlay.

Conclusion

The I-78 Bridge Underclearance Project was a successful PennDOT District 5 ABC project, featuring the first implementation of precast concrete full-height cantilever abutments for PennDOT. The project replaced six bridges over two construction seasons with an average construction duration of 45 calendar days per bridge. The use of prefabricated concrete bridge elements and a time-based bidding technique were both critical aspects of this PennDOT District 5 ABC project.

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At the State Route 183 bridge, ultra-high-performance concrete is placed to fill the beam-to-deck panel connections. Photo: Alfred Benesch & Company.

Elevation view of the State Route 4045 constructed bridge. Exposed concrete surfaces have been stained to enhance the appearance of formed-stone surfaces. Photo: Alfred Benesch & Company.