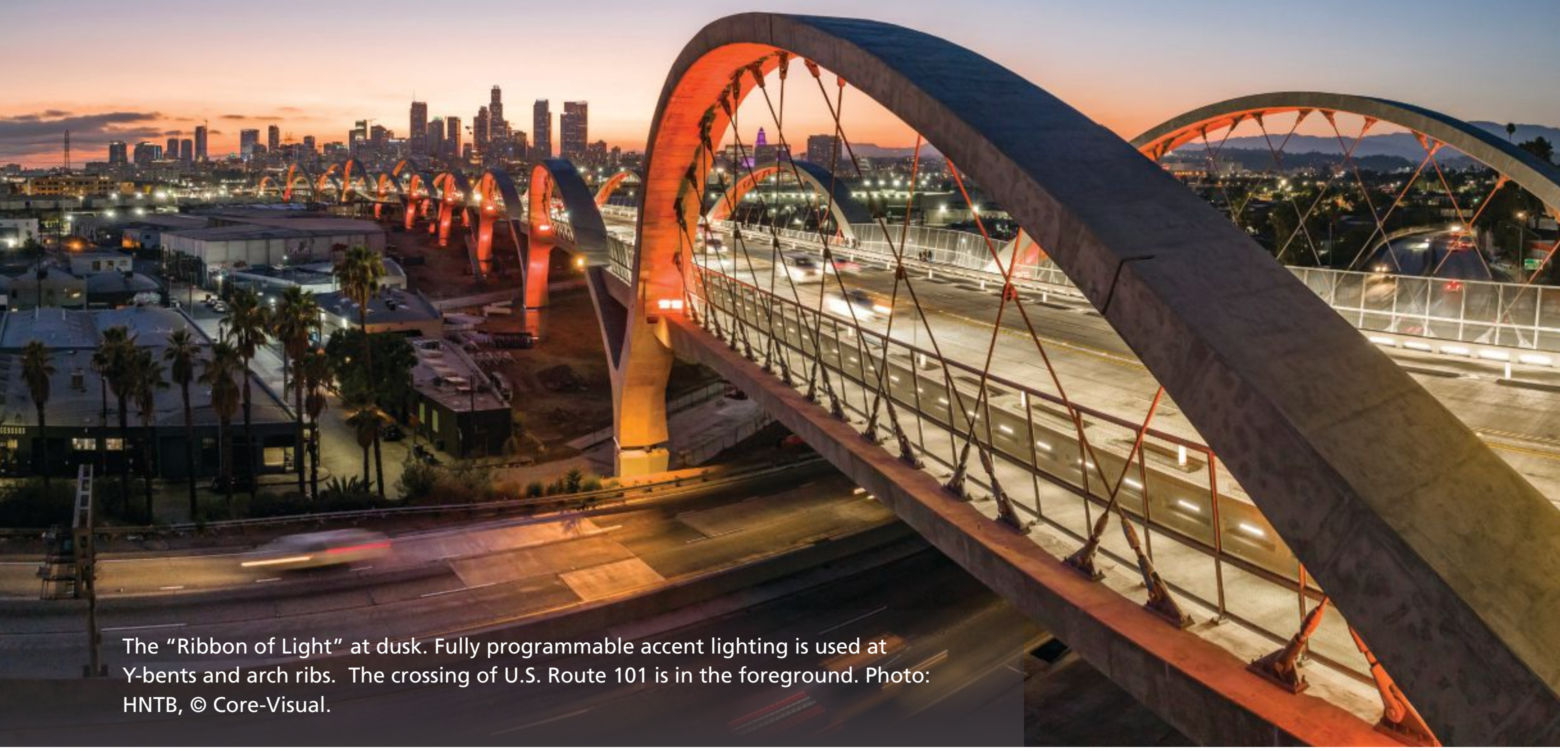

The "Ribbon of Light" at dusk. Fully programmable accent lighting is used at Y-bents and arch ribs. The crossing of U.S. Route 101 is in the foreground. Photo: HNTB, © Core-Visual.

of California. Additionally, the hoisting necessary to construct a cast-in-place structure could be performed with a fleet of truck cranes that were easier to mobilize and maneuver than larger crawler cranes. The shorter booms of the truck cranes would also be more appropriate for work around the power transmission lines that run along the river and for operations within the restricted working areas throughout the project site.

Nevertheless, the project team studied the use of steel floor beams to ascertain whether they would offer any potential cost savings. Given the 100-ft width of the bridge, steel floor beam framing would be about 70% of the total superstructure steel if the entire superstructure, except for the concrete deck, were framed in steel. In the end, studies determined that cast-in-place concrete was the best choice for the viaduct in terms of both cost and aesthetics. Additionally, the expected reduction in dead load between steel and concrete options was not as significant as first expected due to the efficiency of the tied-arch superstructure combined with the Y-bent substructure. The dead load of a typical arch span section with 3-ft-deep edge girders was 195 lb/ft^2, compared with approximately 360 lb/ft^2 for a comparable cast-in-place box girder spanning 300 ft between foundation elements.

Seismic considerations were another concern, particularly when considering the use of steel arch ribs in combination with the concrete substructure. In that type of design, the steel-to-concrete transition connections would have been inordinately complex, in large part due to the high seismicity of the project site. One option was to place the transition some distance above the deck level, to avoid possible seismic hinging locations, but that option lacked the desired aesthetics.

The design team also considered the use of precast concrete floor beams, but they determined that the cast-in-place option was more economical. Cast-in-place edge girders were clearly advantageous for economy,

AESTHETICS **COMMENTARY**

by Frederick Gottemoeller

The original Sixth Street Viaduct was a rare bridge, recognized by millions of people around the world as the background of memorable scenes in dozens of movies and TV shows. However, almost no one knew its name; all they knew was that it was somewhere in Los Angeles. What made the bridge so recognizable was the paired half-through arches spanning the Los Angeles River that were joined in gull-wing fashion. When it became necessary to replace this memorable and unique bridge, the city's Bureau of Engineering set out to create an equally noteworthy replacement. It succeeded.

The design of the new bridge extends the gull-wing half-through arch theme to 10 of the 12 spans. The spans vary in length, but the span-to-rise ratio is kept roughly the same, so the arches vary in height. The result is a new, lively, blocks-long scalloped ribbon within the Los Angeles skyline. The arches are continuously lighted, so that the scalloped ribbon stays visible at night. In a final stroke of genius, the arches are unbraced and lean back from the edge of the roadway at a 9-degree angle, seeming to open up the driver's view of the Southern California sky.

The designers left the arches themselves and their gull-wing Y-bents as pure concrete shapes generated by the fundamental geometry of the bridge. There is no additional embellishment, and none is required, but some remarkable engineering innovation was necessary to make the whole thing work in this active seismic area. As a final touch, the designers attached the stairs and ramps as clearly separate elements, differentiated from the bridge itself by material and shape.

This bridge is a masterpiece. I predict that it will become the background of memorable scenes for numerous new movies and TV shows. All who were involved in its design and construction have the right to be proud.