

Curved, Spliced, U-Girders Gain Momentum

by Craig A. Shutt



Precast concrete spliced U-girders offer key benefits when designing longer spans for continuous structures. Now, curved versions of these girders are expanding the options further—and state departments of transportation (DOTs) are noticing. Officials at the Florida Department of Transportation (FDOT) have put an extensive array of these designs on their website—and they’re being used to win bids.

“U-girders represent a relatively new but standardized cross section that has sufficient strength and stability to benefit long-span bridges in many ways,” says William Nickas, managing director of transportation services at the Precast/Prestressed Concrete Institute (PCI). “Engineers now are building on those concepts to develop curved sections that expand the use of U-girders, especially in freeway interchange projects.”

The girders offer lower fabrication times, faster construction, longer spans, and increased aesthetic appeal due to their ability to provide unified appearance, according to FDOT. Initial work on these designs was done with the Colorado DOT, and now Florida DOT has embraced them as a new option.

The department has devoted a section of its website to the capabilities, showing key requirements, allowances, design criteria, and other data. The site also includes photo slideshows, example drawings created by PCI Zone 6 Producers (SE area), and several presentations, including one showing designs used in Colorado.

The site can be accessed at www.dot.state.fl.us/structures/innovation/UBEAM.shtm or by going to the FDOT site. On the page, click the Offices pull-down menu on the left side, click Structures

Design, then click the large green button marked “Invitation to Innovation.” Under “Innovative Ideas,” click “Curved Precast Spliced U-Girder Bridges.” The site is best viewed through Internet Explorer.

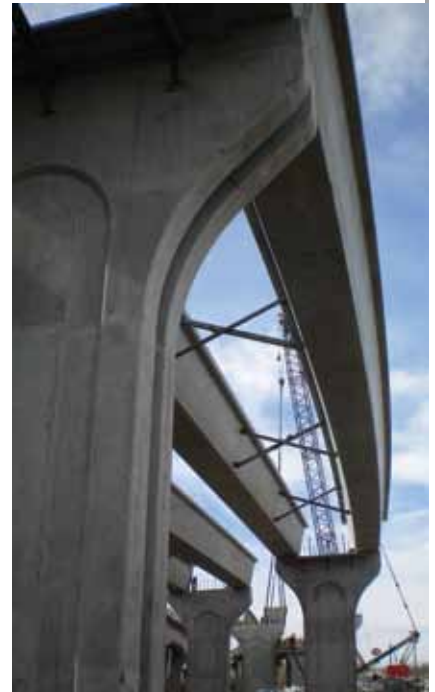
Florida is promoting these designs in part due to its decentralized approach and encouragement of design-build delivery methods. “Success in this new era depends on the ability to innovate the products and services that Florida’s transportation system provides its users,” the site explains. “The Office of Design’s mission for innovation will utilize newly developed technology or employ ‘outside the box’ thinking to generate new and better value for every transportation dollar invested.”

The site encourages designers and contractors “to propose one or more of these innovations for project specific solutions with confidence of approval by the District. Many of these innovations have been successfully implemented in other states and countries,” it says, noting that not all projects will benefit from these new technologies.

Girders at Boggy Creek

Designers and contractors are responding, too. For example, the Boggy Creek interchange on SR 417 in Orlando, Fla., was recently put out to bid with four alternatives by the Orlando-Orange County Expressway Authority. The \$70 million project will revamp the existing interchange to add a flyover and more lanes to help traffic flow more smoothly to the nearby airport and expanding communities. Four options were proposed, and the all-concrete version was the apparent as low bid, based on its use of precast concrete U-girders, including curved segments.

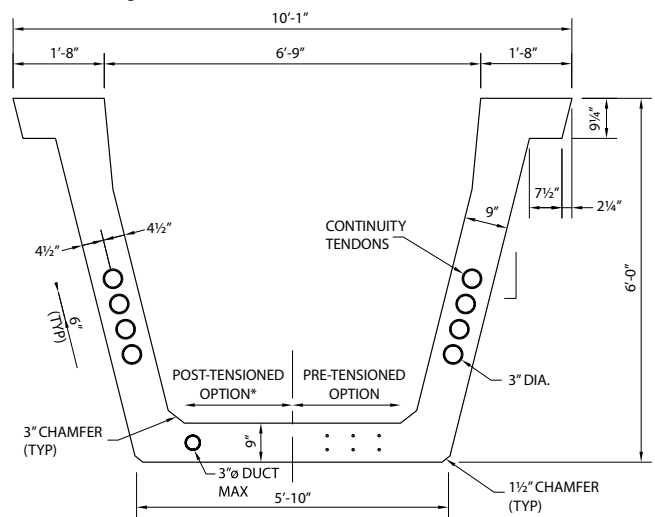
“This project shows that spliced, curved, precast concrete U-girders are more than an innovation to be tested, they are in use and providing benefits to states looking to get the most out of their transportation funding resources, like Colorado and Florida,” says Nickas. PCI now is working with at least three other states to provide solutions and design aids customized to their locations.



Construction of the IH-25 Viaduct, located in Trinidad, Colo., includes spliced, curved, precast concrete U-girders. Photo: PCI.



More information can be found at www.gcpci.org/index.cfm/technical/products.



Typical cross section of the U72-3 curved, precast, spliced U-girders was created by PCI Zone 6 Producers (SE area) and is located on the FDOT website. Drawing: PCI Zone 6 Producers (SE area).