

Improving Florida's Segmental Bridges

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New Coupler System is an Important Step

For the past seven years the segmental bridge industry in Florida has gone through drastic changes. Changes became necessary when major durability and structural deficiencies were discovered in some completed segmental structures throughout the state.

Problems stemmed from corrosion within the steel, post-tensioned tendons that are critical to the design of segmental bridges. In response, the Florida Department of Transportation (FDOT) developed a comprehensive report on the industry as a whole and made recommendations for moving forward, paying particular attention to corrosion protection measures. That report, entitled *New Directions for Florida's Post Tensioned Bridges*, was published in 2001 by Corven Engineering, Inc. The changes it recommended, which the FDOT subsequently mandated, are still being implemented today.

One change involved requiring the use of a mechanical coupling device for all

tendon ducts that cross from one segment to another (Figure A.) This had never been required of post-tensioned or segmental bridges anywhere in the nation. This requirement has the potential to significantly increase the durability and overall quality of segmental bridges.

Advantages offered by the couplers are three-fold. They provide a secure way to connect the ducts to the formwork so they cannot be jarred loose during concrete placement. They prevent the grout, which provides long-term corrosion protection of the steel tendons, from leaking out of the ducts during the pressure grouting operations. Lastly, they provide a protective barrier against moisture intrusion after construction

is complete. This adds another layer of protection for the steel tendons that are so critical to the life of the bridge.

The first project in the State of Florida to make these couplers a contractual requirement is in Jacksonville in Northeast Florida. The I-95/I-295 North Interchange Project was let by the FDOT in April of 2007 and is currently under construction. The Prime Contractor for this project is Superior Construction Company Inc. and their post-tensioning supplier is Dywidag Systems International (DSI). The

project designer is PB Americas and the Construction Engineering and Inspection Firm is RS&H CS. Being the first project in the state to require these couplers meant that the contractor and their

suppliers had to develop a coupler system and gain FDOT approval before they could implement them into the structure. The prototype coupler being used was developed by General Technologies, Inc (GTI), as part of a post-tensioning system supplied by DSI.

This system uses flexible rubber boots that attach to the ducts. This provides some flexibility without compromising proper duct alignment which is critical to post-tensioning tendon installation and overall structure durability. The coupler system also includes a specifically designed rubber gasket that sits in a recess in the face of the coupler piece. This design prevents the gasket from impeding the mating of the segments during erection yet still maintaining a tight seal across the joint.

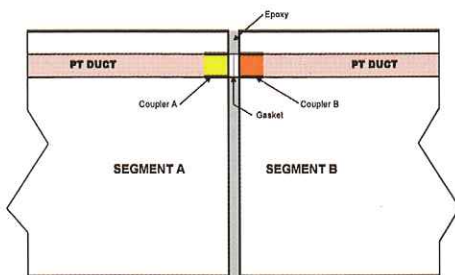


Figure A.



The GTI coupler system has been approved by the FDOT for use on North Interchange project and they are currently being utilized in the structure



I-95/I-295 North Interchange Project

The GTI coupler system has been approved by the FDOT for use on the North Interchange project and they are currently being utilized in the structure. Thus far, through the segment pre-casting phase of the project, the couplers have performed successfully. As the project progresses into the segment erection phase, the couplers will continue to be evaluated to ensure they are meeting the intended goals.

Successful performance of this coupler system on the North Interchange project will be another in a series of positive steps toward improving the quality and long term durability of segmental bridges. Furthermore, it could effect the global segmental industry as Florida has long been seen as an industry leader. To remain an industry leader, the Florida segmental industry has committed to continuing improvements to the quality of the structures it produces. In doing so, the hope is that others will continue to follow Florida's lead. ■