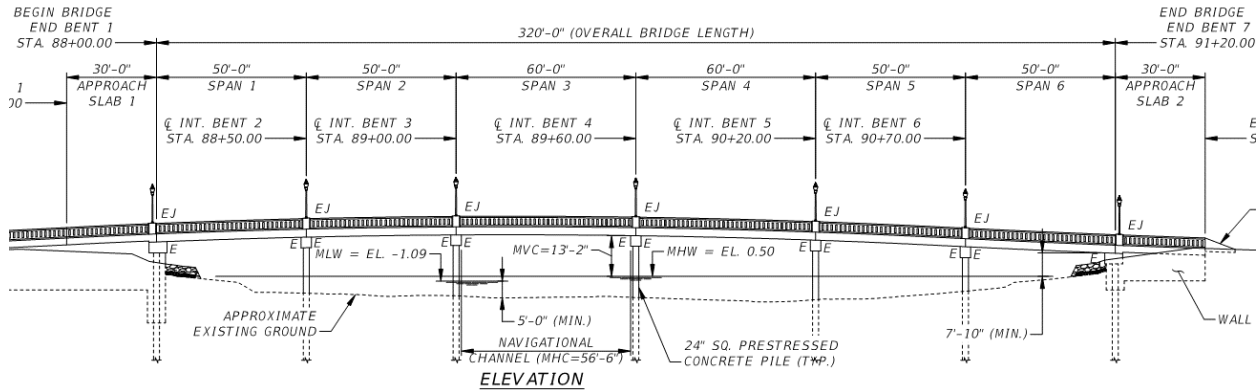


FDOT Transportation Innovation Initiative: FRP – Design Innovation



Fast
Facts:
Carbon &
Glass
Fiber-
Reinforced
Polymer



Project Location: St Petersburg, Florida

Agency: Florida Department of Transportation

URL: <http://www.fdot.gov/structures/innovation/FRP.shtm>

Project Name: 40th Ave NE over Placido Bayou
Bridge No. 157141
FPID: 443600-1-58-01

Project Description: Bridge replacement and over Placido Bayou with CFRP/GFRP FSBs, Bent Caps and Piling

Project Purpose & Need: Replacement of local agency 2-lane bridge, with widened raised sidewalks and bicycle lanes using corrosion-resistant prestressed and reinforced concrete elements for extended durability. The new bridge is 320-feet long x 58-feet wide, four (4) 50-foot spans and two (2) 60-foot spans in the navigation channel with 13-foot vertical clearance at MHW, for passage of recreational watercraft. The existing 19xx superstructure is composed of hollow prestressed “Sonovoid” slab units with severe underside corrosion above the channel navigation spans.

Overall Budget/Cost Estimate: \$ 5,300,000 (Bridge)

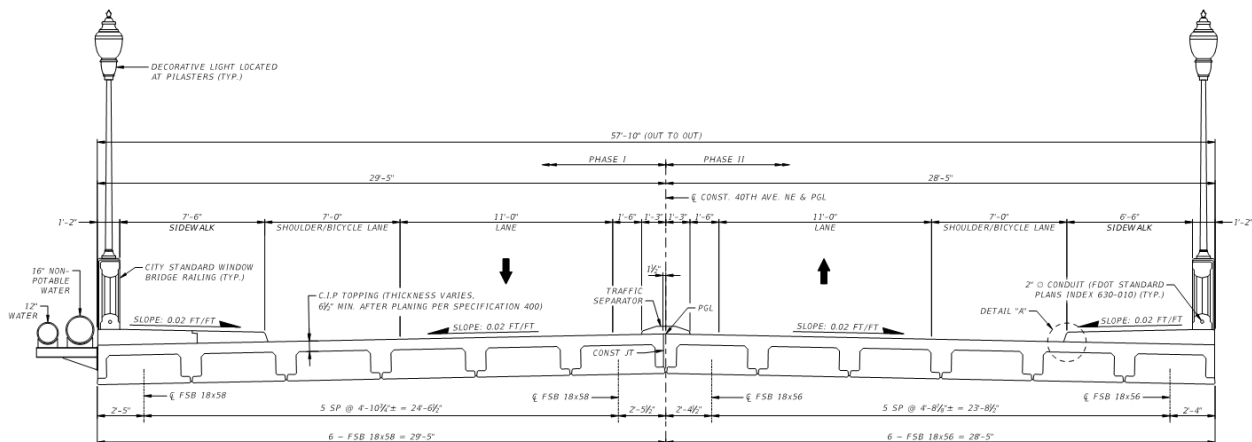
What was unique about this project? Florida's first new vehicular bridge to use CFRP pretensioned slab-beams. Bridge deck, pile bent caps and bulkhead caps using GFRP-RC. Abutments and embankment approaches utilize FRP sheet piles.

Describe Traditional Approach: Superstructures located in the splash-zone require concrete using ternary blends of cement with silica fume, metakaoline, ultrafine flyash or calcium nitrate additives. Also, tensile stresses under service load are usually limited to zero, and waterproofing sealants may be required.

Describe New Approach: Florida Slab Beams (FSB18) using CFRP prestressing strands and GFRP reinforcing to eliminate degradation due to steel corrosion with no need for reduction in the AASHTO LRFD allowable tensile stresses.

- Top Innovations Employed:**
- a) 0.6-inch diameter CFRP strands (approx. 90,000 LF + 15,000 LF Strands N) for prestressing 72~FSB (18"x56" and 18"x58") x 49' & 59' units.
 - b) GFRP shear stirrups and transverse reinforcement in FSBs (approx. 111,000 LF)
 - c) GFRP reinforcement in pile bent caps and bulkhead caps (approx. 119,000 LF #5's and 7,000 #6's)
 - d) CFRP & SS 24" square prestressed concrete piles (approx. 4350 LF)
 - e) FRP sheet piles (approx. 6,800 SF)

Primary Benefits Realized/Expected: FRP reinforcement eliminates the need for additional concrete cover, concrete additives, and waterproofing sealants for corrosion protection. Lightweight reinforcement allows for significantly lower labor and equipment costs because of the handling. Other benefits include longer service life and low maintenance costs for the owner.



Project Start/Completion Dates: 2020 – TBA

Affiliations:

PE Consultant: Cardno
 Construction Contractor: TBA
 Construction Engineering Inspection: TBA

Project Contacts:



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