## FDOT Transportation Innovation Initiative:

## FRP – Design Innovation



## Fast Facts:

Glass Fiber Reinforced Polymer

&

Carbon Fiber Reinforced Polymer

&

Hybrid Composite Beam



Project Location: FDOT District Seven

Citrus County

Homosassa Spring, Florida

Agency: Florida Department of Transportation

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

Project Name: CR-490A Halls River Road over Halls River

Bridge No. 024054 FPID: 430021-1-52-01

Project Description: Bridge Replacement

Project Purpose & Need: The existing bridge was functionally

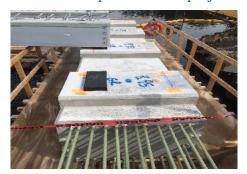
obsolete and listed on the Citrus County Bridge Replacement Program. The purpose of this project is to increase capacity and improve safety of the

existing transportation facility.

Overall Budget/Cost Estimate: \$6,015,645.00 (Construction

Contract)

What was unique about this project?



This project is a demonstration project. Work activities included replacement of the bridge with Hybrid-Composite Beams (HCB) from HC Bridge Company; Prestressed precast concrete square piles and sheet pile walls reinforced with carbon fiber-reinforced polymer (CFRP) strands and stirrups; and Cast-in-place concrete bulkhead caps, pile caps, wing walls, back walls, deck, traffic barriers, approach slabs reinforced with glass fiber-reinforced polymer (GFRP) bars and stirrups. Removable test blocks, reinforced with varying types of FRP bars and strands, will cast with the bulkhead cap for monitoring long-term durability.

Describe Traditional Approach: Traditional approach includes addition of flyash, blast furnace slag, silica

fume and other corrosion inhibitors into cement rich concrete mixes to protect carbon steel prestressing strands and reinforcing with limited long-term success, especially in the presence of concrete cracking.

Describe New Approach: HCB uses galvanized steel strands (as tension reinforcement) encased in

polymer resin with Glass fiber-reinforced polymer beam shell and SCC concrete arch core. GFRP bars and stirrups used in the cast-in-place pile cap, bulkhead cap, deck, traffic railing, approach slab, back wall, wing wall, CFRP strands and spirals in piles, sheet pile walls, in lieu of

traditional grade 60 steel rebar and steel strands.

Top Innovations Employed: Utilization of FRP bars and strands in marine environment.

Primary Benefits Realized/Expected: Longer service life of the bridge without major maintenance.

Project Start Date/Substantial Completion Date: 1/9/2017 – 2018

Affiliations: PE Designer: FDOT District Seven

PE Consultant: American Consulting Engineers of FL.

Construction Contractor: Astaldi Construction Corp.

Construction Engineering Inspection: FDOT/Brooksville Operation, JACOBS

Engineering, and Cardno TBE.

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