FDOT Transportation Innovation Initiative:

FRP – Design Innovation

Fast Facts:

Glass Fiber Reinforced Polymer

UNIVERSITY OF MIAMI

Project Location:	Coral Gables, Florida
Agency:	University of Miami
URL:	http://www.fdot.gov/structures/innovation/FRP.shtm
Project Name:	Fate Pedestrian Bridge
Project Description:	This three-span pedestrian bridge with a short cantilever end allows for the crossing of the Lake Osceola at the University of Miami, Coral Gables Campus.
Project Purpose & Need:	Designed by renowned Arquitectonica, the Fate Bridge not only connects two sides of the campus, but also intends to become itself a place for gathering and reflection. The silhouette of the bridge with its variable cross-section is like an extension of the water surface. The bridge with an embedded monitoring system is a living laboratory to educate engineering and architecture students.

Overall Budget/Cost Estimate: $ 2,500,000.

What was unique about this project?

The hybrid superstructure combines the composite action of two wide-flange steel girders encased in reinforced concrete (RC) to provide the required strength and aesthetic appearance. The RC deck in turn combines traditional bottom black steel reinforcement with glass fiber reinforced polymer (GFRP) rebars as top reinforcement closer to the surface exposed to pedestrian traffic and temperature variations.

Describe Traditional Approach:

This project's superstructure initially specified the use of traditional black steel for all reinforced concrete elements. The superstructure is supported by RC pile-caps over driven piles made of conventional precast-prestressed concrete.

Describe New Approach:

UM Civil, Architectural & Environmental Engineering Department proposed to replace the steel reinforcement top mat of the deck with an equivalent one made of non-corrosive GFRP rebars. Although bridge decks with GFRP reinforcement have been built in other states, this is a first attempt in Florida aiming at addressing low maintenance and improved sustainability.

Top Innovations Employed:

Bent GFRP rebar technology is now available providing numerous shape bents for different purposes such as open or closed stirrups and standard hooks.

Primary Benefits Realized/Expected:

In addition to demonstrating the deployment of new technology with advantages on ease of installation, the bridge deck will not require traditional maintenance. The instrumented superstructure will contribute to the education of future engineers and architects by demonstrating the relationships load-strain and temperature-strain in a field structure.

Project Start/Completion Dates:

6/2015 – 9/2015

Affiliations:

General Contractor: Moss & Associates
Engineer of Record: Brill Rodriguez Salas & Associates Inc.

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