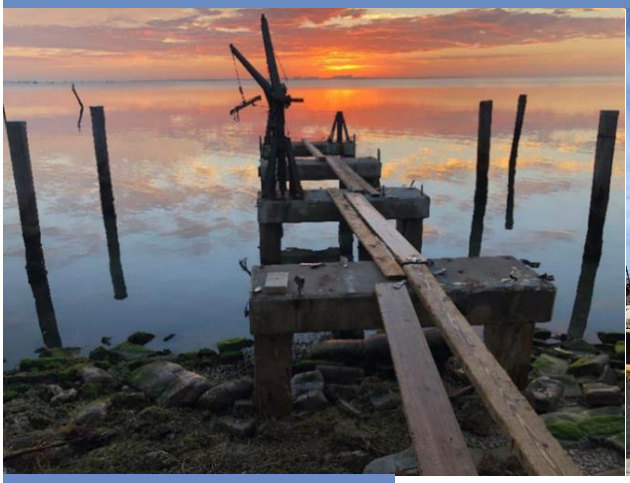
# FDOT Transportation Innovation Initiative:

# FRP – Design Innovation



## Fast Facts:

## Basalt and Glass-Fiber Reinforced Polymer

UNIVERSITY OF MIAMI

| | |
|---|---|
| Project Location: | Biscayne Bay, Miami, Florida |
| Agency: | University of Miami with Private Property Owner |
| URL: | *http://cici.um-sml.com/* |
| Project Name: | Innovation Dock [i-Dock] Biscayne Bay, Miami, FL |
| Project Description: | Replacement of Hurricane Irma damaged Concrete Pile and Wooden Dock with, BFRP and GFRP-RC Precast Concrete Components, Elements and Gratings. |
| Project Purpose & Need: | To provide a demonstration *Prototype* for Precast-Concrete Dock & Pier Modular-Systems, that exhibits extended Durability and Resilience to Extreme Events. |
| Overall Cost Estimate: | $ 50,000.00 |

What was unique about this Project? BFRP and GFRP Structurally Reinforced Precast-Concrete Dock, with Pile-Caps, Slab-Beams, End-Beams, GFRP Dowel-Connectors, BFRP-Mesh and RC-Piles.

Describe Traditional Approach: Precast Steel-Rebar Reinforced Piles and Cast-in-Place Concrete Caps, with Timber Deck-Beams and Wood Planking subject to corrosion.

Describe New Approach: Precast Modular-Units, with "Rapid Assembly Time", with Basalt and GFRP Structural Reinforcing to eliminate corrosion and costly future maintenance.

Top Innovations Employed:
(a) 8~Precast GFRP-RC Pile Driven Piles [12 in. x 12 in. x 24 ft.]
(b) 4~Precast GFRP-RC Pile-Bent Caps [12 in. x 30 in. x 8 ft.]
(c) 8~Precast BFRP-RC Precast Slab-Unit [8 in. x 33 in. x (10 to 12 ft.)]




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, due to ease of handling and transportation savings. Additional Owner Benefits include an extended Service Life and significantly reduced Maintenance Costs.



Project Completion Date: June 2019

Affiliations:

UNIVERSITY OF MIAMI

| | |
|---|---|
| Project Consultant: | University of Miami - Civil Engineering Dept. |
| Construction Contractor: | Dock and Marine Construction Corp. |
| Engineering Inspector: | Christian C. Steputat, P.E., LEED AP [BD+C] |
| Project Contact: | Antonio Nanni, Ph.D., P.E. *nanni@miami.edu* |