



**Project Number**

BDV29-977-11

**Project Manager**

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**Principal Investigator**

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**Current Situation**

Most movable bridges within Florida have decks that are open grid steel decks, which are often cited for poor rideability, susceptibility to fatigue, and high noise levels. Also, maintenance of these deck systems is increasingly difficult due to high maintenance costs and prolonged periods of traffic delay.

**Research Objectives**

Florida International University researchers investigated a number of alternative bridge deck systems, which had been evaluated in prior research, to lay a complete foundation for further design and implementation procedures. The main objectives of the deck alternatives were to meet the loading and serviceability requirements while satisfying a maximum 21-pound-per-square-foot weight requirement.

**Project Activities**

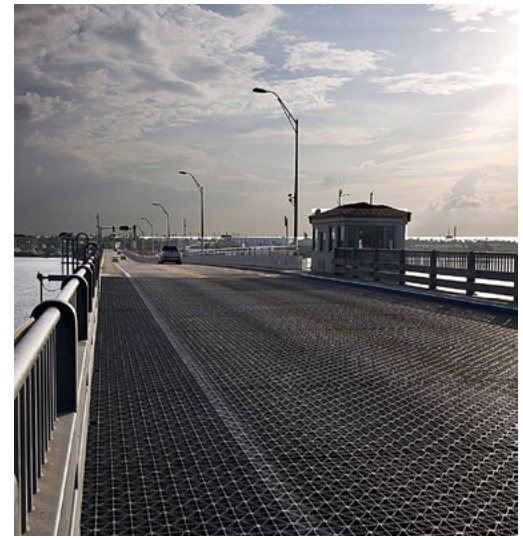
The researchers developed and examined three bridge deck alternatives: ultra-high performance concrete (UHPC)-high-strength steel (HSS); UHPC-carbon-fiber-reinforced polymer (CFRP); and a UHPC-fiber-reinforced polymer (FRP) hybrid tube deck.

UHPC waffle decks composed of alternative materials were made in overall depths ranging from 4 to 5 inches with rib spacings of 12 or 15 inches and minimum deck thicknesses of  $\frac{3}{4}$  to  $1\frac{1}{4}$  inch. The decks were tested in both static flexure and shear and by simulated truck passages using a heavy vehicle simulator (HVS). The static flexure and shear tests were characterized by deflection and strain. Failure modes were documented.

**Project Benefits**

The successful application of alternative materials can lead to bridge decks that demonstrate improved performance as well as reduced maintenance costs.

*For more information, please see [dot.state.fl.us/research-center](http://dot.state.fl.us/research-center)*



*Open grid steel bridge decks are widely used, yet they are not an ideal driving surface, and they are costly to maintain.*