

Hybrid Concrete FRP Composite Decking System

Riyad Aboutaha, Ph.D.
Department of Civil &
Environmental
Engineering

Invention

Fiber reinforced polymer (FRP) composite bridge decks provide mechanical properties superior to those of standard concrete decks due to the tensile strength provided by the fibers. However, most existing FRP decks suffer from surface delamination due to traffic, thermal, and environmental loads. This invention presents a concrete and FRP composite hybrid decking system with improved material properties and a decreased tendency toward surface delamination.

Technology

The hybrid decking system is composed of a bottom plate, tubular midsection, and concrete top slab. The bottom plate and tubular sections are comprised of reinforcing fibers embedded in a polymer resin. An FRP mesh is bonded to the sides of the tubular sections and protrudes into the concrete top slab. The top concrete slab is reinforced with an FRP mesh, and can be additionally reinforced using FRP rebar. The top surface of the tubular section can be treated with polymer concrete and all other sections mechanically roughened in order to improve mechanical bonds between hybrid components and improve skid resistance.

Applications

- Bridge decks
- Roofs
- Slabs
- Beams
- Girders
- Flexural members
- Highway longitudinal guide-rails

Advantages

- All hybrid elements are easy to manufacture and assemble
- Roughening of sections enables a stronger mechanical bond between components
- High strength to weight ratio
- Corrosion resistance
- High fatigue resistance
- Concrete slab is resistant to wear and provides skid resistance



Syracuse University actively seeks to partner with businesses for purposes of building expertise, expanding your IP portfolio, licensing, and other opportunities for university/industry collaboration.