



Innovative Modular High Performance Lightweight Decks for Accelerated Bridge Construction

Description

Meta Fields

Category : Completed Projects

Group : Decks

Subject : Deck Panels

Abstract :

Of the over 605,000 bridges in the U.S., about 12% are structurally deficient and another 16% are functionally obsolete (FHWA 2012). Three out of four structurally deficient bridges have major problems with their decks. The primary objective of the proposed research is to develop innovative modular high performance lightweight deck options that lend themselves to accelerated bridge construction (ABC). Such bridge decks would allow an increase in the load rating of existing bridges and accordingly improve their functionality and service life. The lightweight bridge deck would also allow widening of existing bridges without placing additional dead weight on their substructure.

Given the primary objective of the NCTSPM (i.e., to improve the productivity and management of the U.S. Transportation System in an accountable and measurable way), and the fact that constrained resources are the greatest barrier to achieving this objective, the proposed research addresses two of the fundamental three questions of the 2014-15 solicitation; How do we get most out of the existing transportation systems? And how should we build for the future? The proposed bridge deck systems improve the state of good repair in bridge infrastructure throughout the U.S., thereby improving public safety on their daily commute. This will lead to the next generation transportation infrastructure, which is the first defined NCTSPM research area, as these systems address the fundamental issue of maintenance of existing bridge decks, an ongoing challenge with almost every transportation agency in the U.S. The proposed deck options also address durability of deteriorating infrastructure in constant need of rehabilitation.

The innovative lightweight bridge decks will be modularized and prefabricated with highest quality control and quality assurance during the manufacturing process. The systems would integrate advanced construction materials, including ultra-high performance concrete (UHPC), high-strength steel (HSS), and fiber reinforced polymer (FRP), as appropriate. The systems would also provide options for different arrangements of superstructure, including different girder spacing.

Key Words :

Bridge decks, Load factor, Bridge construction, Defects, Aging infrastructure, Service life, High performance concrete, Fiber reinforced polymers, Lightweight materials

Budget : 180000.00

Project Length : 18

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