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Tomasz Siwowski, Damian Kaleta, Mateusz Rajchel

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Tomasz Siwowski (corresponding author)
Rzeszow University of Technology
35-959 Rzeszow
Al. Powstancow Warszawy 12
Poland
siwowski@prz.edu.pl

Damian Kaleta
Promost Consulting
35-308 Rzeszow
Ul. Niemierskiego 4
Poland
kaleta@promost.pl

Mateusz Rajchel
Rzeszow University of Technology
35-959 Rzeszow
Al. Powstancow Warszawy 12
Poland
mrajchel@prz.edu.pl

Abstract

Fiber reinforced polymer composites have become an integral part of the bridge industry because of their versatility, high strength-to-weight ratio and enhanced durability. The novel idea of an all-composite structural system for road bridges has been proposed for the first time in Poland. The FRP bridge is a simply supported structure with 10.0 m long span and 7.66 m wide deck. The superstructure consists of four U-shaped girders bonded with sandwich deck slab, fabricated by means of a vacuum infusion. The bridge configuration, a finite element model developed for design and the proof test results are described in this paper. The test has shown that an all-composite bridge can meet the relevant strength and deflection design criteria. To develop an understanding of the long-term performance of the FRP bridge, a monitoring scheme utilizing distributed fibre-optic sensors was implemented to assess any changes in the bridge structural behaviour.

Keywords

FRP bridge, all-composite superstructure, FEM model, proof test, monitoring, DFOS

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