Assessment of Bridge Technologies through Field Testing

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Objectives:

1) Assessment of new bridge structures utilizing conventional reinforced concrete (RC) and FRP technologies.

2) Demonstration of the viability of advanced construction methods aimed at improving constructability and long-term durability of the transportation infrastructure.

Background

Four bridges (B200133, B200134, B200148 and B200149) located in the state of Wisconsin were tested in order to detect difference in response as a result of the construction technology. Bridge B200134 with an FRP reinforced deck, is nominally identical to B200133 whose deck was reinforced with conventional steel bars. B20148 and B20149 were constructed as “twin” bridges: the former utilizing FRP bars as reinforcement and the latter using conventional steel reinforcement. Test results and theoretical analysis (using AASHTO and FEM methods) are compared.

Finite Element Analysis

2D-Model Considers:

1.- Effect of Skew Angle.
2.- Different Material Behavior (FRP and Conventional Reinforcement).
3.- Temperature Effects.

Load Test of bridges B200133 and B200134

Test Results (Longitudinal Deflection - B-20-149)

Testing Protocol

A deflection monitoring method that makes use of a high performance Total Station System, commonly employed for high precision surveying, was used to remotely measure and record girder and deck displacements.

Test Results (Longitudinal Deflection - B-20-149)