Improving Bridges with Prefabricated Precast Concrete Systems

Description

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Primary Sponsor Contact Info : Michigan Department of Transportation Murray Van Wagoner Building 425 West Ottawa, P.O. Box 30050 Lansing, MI 48909 USA
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Bridge construction; Cement grouts; Concrete bridges; Decision support systems; Precast concrete; Prefabricated bridges; State of the practice; Structural connection

Abstract :

In order to minimize the impact of construction on the traveling public, Michigan Department of Transportation (MDOT) utilizes innovative and specialized construction methods such as Accelerated Bridge Construction (ABC). Michigan, like other highway agencies in the region, has several challenges in specifying prefabricated bridge elements and systems (PBES) and accelerated bridge construction (ABC) techniques for bridge replacement projects. Among those challenges, the following are the most common: (1) justification of initial project costs, (2) defining a rational process for selecting ABC over conventional construction, (3) absence of PBES selection guidelines and proven standard and successful designs, (4) absence of constructability evaluation guidelines, and (5) uncertain durability performance of PBES and connections. This research project was initiated with several objectives. They were achieved by (1) synthesizing the state-of-the-art practices, challenges, and lessons learned from the implemented ABC projects, (2) developing a Michigan-specific decision-making platform based on the site specific data to identify the optimal construction alternative between conventional construction and ABC, (3) developing a comprehensive list of connection details and cementitious materials for connections, (4) developing standard deck level longitudinal connection details for typical highway bridges, (5) developing a template of special provisions for grout selection and application procedures, (6) documenting construction procedures, equipment, and implementation limitations, (7) developing a constructability review checklist, and (6) providing recommendations for further research and implementation of PBES based on constructability, maintainability, repairability, and durability.

Subject : MIDOT/AHP, PBES, Connections, Grouts, DMT, Means/Methods
Group : Design-Making Tools
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