

Full Depth Precast Concrete Bridge Deck Panel Systems, NCHRP 12-65, Report 584

Description

Meta Fields

Category : Completed Projects

Group : Decks

Subject : Deck Panels

Abstract :

NCHRP Report 584 provides recommended guidelines and AASHTO LRFD Specifications language for design, fabrication, and construction of full-depth, precast-concrete bridge deck panel systems. Durable and rapidly constructed connections between panels were also developed as part of this research. The report details the development of the guidelines, connection details, and recommended specifications. The material in this report will be of immediate interest to bridge designers.

The impact of highway construction projects on the public is considerable. Increased travel times resulting from congested construction work zones and the resultant degradation in traffic safety are the most readily apparent consequences. Development of a totally precast bridge construction system offers one means of significantly reducing construction time, because forming, casting, and curing operations can be carried out at a remote location with less on-site impact on motorists. Considerable time can be saved on bridge construction projects through the use of precast bent caps, columns, parapets, abutments, and other components.

Development of a full-depth, precast-concrete bridge deck panel system with a ride quality suitable for high-speed, direct traffic contact would be a major achievement, complementing work being done elsewhere in developing a totally precast bridge construction system. Previous research has resulted in implementation of post-tensioned and overlaid systems for connection durability and ride quality. Issues that have been addressed include panel casting and placement tolerances, shear connections, vertical alignment, final grade adjustment, drainage, and parapet connections.

The objectives of this research were to develop recommended guidelines and AASHTO LRFD Specifications language for design, fabrication, and construction of full-depth, precast-concrete bridge deck panel systems and to develop durable and rapidly constructed connections between panels. To reduce total deck construction time, full-depth, precast-concrete bridge deck panels that provide connection durability and ride quality without the use of post tensioning and overlays were developed. Connections suitable for simple and continuous spans and composite and noncomposite design were also developed and other connection details that reduce construction time associated with precast decks were investigated. In addition, applications for steel and prestressed concrete superstructures were investigated and research to extend the 24 in. maximum shear connector spacing to 48 in. was performed.

This research was performed by The George Washington University, Washington DC, the University of Nebraska-Lincoln, and Tadros Associates, LLC. The report fully documents the research leading to the recommended design, fabrication, and construction guidelines, specification language and connection details.

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