Precast Concrete Elements for Accelerated Bridge Construction

Description

Meta Fields
Project Completion Year : 2009
Project Starting Year : 2006
Other Documents 0 Other Documents File : 2464
Primary Sponsor Contact Info : Iowa Department of Transportation 800 Lincoln Way Ames, IA 50010 USA Federal Highway Administration 400 Seventh Street, SW Washington, DC 20590 USA
Project Length : 30
Budget : 0.00
Key Words :

Bridge abutments; Bridge decks; Bridge substructures; Concrete bridges; Field tests; Girders; Laboratory tests; Posttensioning; Precast concrete; Prestressed concrete; Shear strength

Abstract :

In July 2006, construction began on an accelerated bridge project in Boone County, Iowa that was composed of precast substructure elements and an innovative, precast deck panel system. The superstructure system consisted of full-depth deck panels that were prestressed in the transverse direction, and after installation on the prestressed concrete girders, post-tensioned in the longitudinal direction. Prior to construction, laboratory tests were completed on the precast abutment and pier cap elements. The substructure testing was to determine the punching shear strength of the elements. Post-tensioning testing and verification of the precast deck system was performed in the field. The forces in the tendons provided by the contractor were verified and losses due to the post-tensioning operation were measured. The stress (strain) distribution in the deck panels due to the post-tensioning was also measured and analyzed. The entire construction process for this bridge system was documented. Representatives from the Boone County Engineers Office, the prime contractor, precast fabricator, and researchers from Iowa State University provided feedback and suggestions for improving the constructability of this design. All of these areas are included in this first section of Volume 1. The second section of Volume 1 focuses on the laboratory testing of full-depth precast, prestressed concrete deck panels used in the construction of the continuous four-girder, three span bridge over Squaw Creek on 120th Street in Boone County, Iowa. Various laboratory tests were conducted on a single panel and on two panels connected by a closure pour. These tests ranged from

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determining physical properties of the panel (compressive strength and prestressing force), to determining the panelâ€™s response in various circumstances (moving with a crane, during field leveling, and under loading). The third and final section of Volume 1 documents the field testing portion of this project. Two field tests were carried out on the Boone County bridge. The first took place the summer following construction and the second took place one year later. A summary of the testing process, instrumentation plan, and analysis of data are located in this section of the report.

Subject : In-service Testing Pile Pockets, Deck Panels,
Group : Standards
Category : Completed Projects

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