

Precast, Post-Tensioned Bridge Approach Pavement

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ABSTRACT

Bridge owners are frequently faced with the need to replace critical bridge components during strictly limited or overnight road closure periods. This paper presents the development, testing, installation, and monitoring of a precast, post-tensioned bridge approach pavement that was specifically designed for the Iowa Department of Transportation to address this condition.

Roadway pavement adjacent to a bridge has frequently been observed to undergo settlement due to a variety of causes. This settlement results in a loss of support for the pavement, and, if left untouched, the settlement creates a very noticeable bump at the end of the bridge. This bump can be very frustrating and dangerous for the traveling public. In addition, the bump results in considerable wear on the ends of the bridge and requires expensive maintenance for bridge owners.

A precast, post-tensioned concrete approach pavement was designed and constructed as part of the Federal Highway Administration's Concrete Pavement Technology program. The precast approach pavement system is intended for use in either new construction or retrofit applications and can be installed in single-lane widths to permit staged construction under traffic. This precast pavement offers a number of additional benefits, including the ability to span the areas of soil settlement near the bridge, significantly reducing the bump.

A project site near Sheldon, Iowa, was chosen as the location for installation of this precast bridge approach pavement. In order to eliminate a problematic open joint in the pavement near the abutment, the precast pavement was structurally connected to the bridge abutment using steel dowel rods. This type of connection had not previously been used by the Iowa Department of Transportation.

A structural health monitoring system was installed to document and evaluate the performance of both the approach pavement and the bridge over one full year of thermal expansion and contraction.

This presentation describes the development of the precast bridge approach pavement, its installation in the field, and the results of structural monitoring that will be continuing through the end of 2007.

Key words: bridge repair—precast—post-tensioned pavement—post-tensioning