

Public Abstract

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Graduation Year: 2006

Title: Instrumentation and Early Performance of an Innovative Prestressed Precast Pavement System

Traffic, weather and de-icing salts continually diminish pavement life. Current rehabilitation methods result in traffic congestion and lost work time. Prestressed precast panels are roadway panels that are constructed in a precast yard and then placed on-site. The term prestressed refers to tensioned steel strands that are stressed with hydraulics to induce a compressive force in the concrete panel. Concrete is weak in tension, therefore, this compressive force improves durability and performance. The use of prestressed, precast panels for the replacement of damaged roadways and intersections will give designers a significant advantage in improving pavement performance, decreasing construction time, and mitigating user costs. This technology applied to roadway panels is a new concept and requires research and development.

A pilot project, funded by FHWA, was created for a 1,000 ft stretch of pavement on I-57 in southern Missouri. Seven of the 100 precast roadway panels used were instrumented to monitor temperatures, strains, and strand strains during fabrication, construction, and service.

Objectives include examining early curing performance, comparing stress transfer strains (both pretensioning and post-tensioning) to predictions, and analyzing service performance related to daily thermal variations, seasonal trends, and traffic. Condition surveys and materials studies complete the year long performance evaluation and are discussed in companion works by Brent Davis and Grant Luckenbill (currently underway).