

EVALUATION OF PRESTRESS LOSSES IN AN INNOVATIVE PRESTRESSED PRECAST PAVEMENT SYSTEM

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ABSTRACT

To date no streamlined user efficient concrete roadway rehabilitation method is in practice in the United States. However, the use precast pavement is being evaluated and successful projects in Georgetown, Texas, El Monte, California, and most recently Charleston, Missouri are paving the way for the use of prestressed precast concrete pavement. The use of prestressed precast concrete pavement for the replacement of damaged roadways gives contractors and designers significant advantage by decreasing construction time, improving pavement performance, and mitigating user cost.

The project in Charleston, Missouri, funded by the FHWA and MoDOT, is the focus of this thesis. A total of 101 panels were cast and seven were instrumented to monitor temperature and strain.

The objectives set forth were to understand important properties of the materials used, study losses due to creep and shrinkage of precast pavement panels, and develop pre and post-tension loss prediction models and compare them to actual values measured in the pavement. Concurrent works by Cody Dailey and Grant Luckenbill examine early age performance of the precast panels and analyze strains relating to daily thermal gradients, seasonal trends, and traffic.