

## Research Notes

Program Steering Committee (PSC): Pavement

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Title: Design and Construction Guidelines for Thermally Insulated Concrete

Task Number: 1134

Start Date: January 1, 2007

Completion Date: December 31, 2013

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### **TITLE:**

Design and Construction Guidelines for Thermally Insulated Concrete

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### **WHAT IS THE NEED?**

Thermally insulated concrete pavements (TICPs) consist of a concrete pavement structure covered by an asphalt concrete layer during construction or soon after construction to address ride quality or surface characteristics issues. Although the concept of TICPs has long been recognized,

There is a need for effective design construction guidelines for TICPs. These guidelines should be based on a better understanding of the effects of design, materials, and construction parameters on the performance of TICPs. This pooled fund project aims to develop such guidelines for effective mechanistic design and construction.

### **WHAT ARE WE DOING?**

This pooled fund project focuses on the development of practical guidelines for design, analysis, and construction of TICPs. The project also includes tasks to validate the structural and climatic models of the Mechanistic-Empirical Pavement Design Guide (MEPDG) for asphalt overlays of concrete pavements, investigate the applicability of the MEPDG for design of TICP pavements, and investigate the applicability of reflection cracking and asphalt rutting models developed in California.

### **WHAT IS OUR GOAL?**

The main objective of the proposed research is to develop design and construction guidelines for thermally insulated concrete pavements (TICP). Specific objectives of the proposed study include determining behavior of the layers of the TICP system, understanding life-cycle costs and the feasibility of TICPs, incorporating the results into design and construction guidelines. These objectives would be accomplished by collecting field performance data and evaluating the influence of design, material properties, and construction on the performance of TICP test sections at the Minnesota Road Research project (MnROAD).

## **WHAT IS THE BENEFIT?**

This research would allow construction and design decisions to be driven by direct experimental results rather than by models that may not have been calibrated for the types of loadings and tire configurations of current traffic. The research will fill a large gap in knowledge in that, due to the construction of composite pavements having tailed off in the 1960s, research of composite pavement design and construction practices has been very dormant in the past 25 years. The pavement community would benefit greatly from a new understanding of composite pavements, especially as American agencies take notice of the success of composite pavements overseas.

## **WHAT IS THE PROGRESS TO DATE?**

This project has been completed. The research team delivered the final report and other deliverables on schedule, including design, analysis and construction guidelines for TICPs. FHWA issued a close out memo on July 1, 2013, and this project is officially closed.

Overall, this pooled fund project led to research products that have immediate application in the design and construction of composite pavements. The applicability of the results extends past TICP and into general composite pavements containing AC overlays of PCC pavements. The research products are available on-line at:

<http://www.dot.state.mn.us/mnroad//projects/TICP/index.html>