

Magnetic Tomography – Assessing Tie Bar and Dowel Bar Placement Accuracy

Report Number: KS-17-05 • Publication Date: December 2017

Cliff Hobson, P.E.

*Kansas Department of Transportation
Bureau of Research*

Introduction

The Kansas Department of Transportation (KDOT) constructs portland cement concrete pavements (PCCP) for new highway expansions and/or for replacement of existing highway pavement using slip-form paving operations. Typical concrete pavement construction in Kansas requires reinforcing steel across the joints.

Correct placement of reinforcing steel in the PCCP is critical for good performance and long life of highways. However, once immersed in the concrete paste, steel placement is difficult to measure with non-destructive methods. Sometimes the steel bars are inserted (placed) using automated equipment. If the insertion process isn't accurate, such that the steel bars are mislocated, costly remedial action can be required.

*Prototype Built and
Tested by KSU in 2006*



Project Description

Timely detection of misplaced steel would provide feedback needed to correct the construction process. To address this need, KDOT developed a field instrument capable of non-destructively assessing the placement (depth and orientation) accuracy of reinforcing steel in PCC pavement using magnetic tomography technology with real time feedback. Several iterations of prototype carts were developed. The final prototype cart developed and constructed used two sensors to determine the steel location.

Project Results

The long-term direction for this research project was to develop an instrument capable of efficiently assessing the real-time placement accuracy of reinforcing steel in slip-form PCCP paving operations. However, the project was discontinued when the sensor supplier's modified sensor boards weren't reliable, their customer service was less than desired, and no alternate sensor suppliers were available.

Project Information

For information on this report, please contact Cliff Hobson, P.E., Advanced Technology Research Engineer, Bureau of Research, Kansas Department of Transportation; 2300 SW Van Buren, Topeka, KS 66611; (785) 291-3843 phone; Cliff.Hobson@ks.gov.

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