

Research Notes

Program Steering Committee (PSC): Pavement

JUNE 2014

Title: PPRC 11 SPE 4.32 - Early-age Cracking Performance

Task Number: 2352

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Task Manager:

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TITLE:

Early-age Cracking Performance

WHAT IS THE NEED?

It is well known that early age cracking occurs in some Portland cement concrete (PCC) pavements and adversely affects the structural performance of these pavements. However, it is not easy to know in advance whether a particular project would have early-age cracking. In order to prevent or minimize early-age cracking, it is necessary to identify and control design and construction variables that would influence early-age cracking performance.

Caltrans has made several changes in construction and materials specifications in the past 10 years which might have affected early-age cracking performance of PCC pavements placed since then. This task will first evaluate the extent of early-age cracking in PCC pavements placed in the past years and then to develop appropriate design parameters and/or construction procedures to limit or prevent early-age cracking in PCC pavements.

WHAT ARE WE DOING?

The objective of this study is to develop recommendations to reduce the risks of early-age and premature cracking in concrete pavement projects. This will be achieved through the following tasks:

1. Literature review on research related to the topic.
2. Review Caltrans specifications and practices for potential need for improvement related to early age cracking.
3. Develop computational models to simulate the mechanisms of early-age and premature cracking and identify critical factors affecting early-age and premature cracking.
4. Monitor on-going construction projects to evaluate gaps in the current construction specifications or whether there is a need for better enforcement of the current specifications.
5. Statistical review of concrete pavements in California using condition survey data extracted from *PaveM*.

WHAT IS OUR GOAL?

Evaluate extent of early-age cracking and identify potential causes of the distress. Assess risks of early-age cracking in concrete pavement construction and provide recommendations to reduce the risks of early-age and premature cracking in concrete pavement projects.

WHAT IS THE BENEFIT?

This research product will help Caltrans improve its current design and construction practices related to the early-age cracking performance so that the department may reduce the risk of early age cracking in concrete pavement construction. This will ultimately lead improved pavement performance and pavement maintenance and rehabilitation cost savings.

WHAT IS THE PROGRESS TO DATE?

The task has been delayed because of repeated requests from Caltrans Pavement Program for revisions of detailed work plan. The work plan has been finalized, and the task is in progress on a revised schedule. This task will be continued in the next PPRC contract.