Research Project

98-6P

Capsule

LTRC

Technology Transfer Program

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Evaluation of Narrow Transverse Contraction Joints in Concrete Pavements

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Problem

Establishment of transverse contraction joints is a necessary part of any concrete pavement construction (with the exception of continuously reinforced concrete pavement). This allows the pavement designer to control the location of cracking, by creating a weakened plane in concrete pavements through sawing or other methods. This weakened plane creates a path of least resistance for the stresses generated within the concrete during the shrinkage process, which results in the formation of a crack underneath the sawed joint. Load transfer devices are placed at these locations to provide loading continuity when the pavement is subjected to traffic. The opening that is initially created by sawing is later widened to allow the placement of joint sealer materials to eliminate water and other incompressible materials intrusion.

The lack of joint maintenance, or periodic cleaning and resealing joints, has

Creating a transverse joint using the saw cut method.

Development of controlled crack at the transverse joint.

been blamed for the excessive deterioration of concrete pavements at the joints. Additionally, some joint sealants fail shortly after placement, leaving the widened opening at the surface exposed to water intrusion or penetration of loose debris. The motoring public complains about the familiar but aggravating sound that these damaged and widened transverse joints make when automobile tires travel across them at highway speeds.

Objectives

The aim of this research project is to determine the effectiveness of establishing narrow transverse contraction joints and if it is necessary to have joints sealed at all.

Description

Selection of the project:
Northline Road, Port Allen, was selected to determine the effectiveness of establishing narrow transverse contraction joints in Louisiana JPCP. The road begins from Route LA-1 service road and ends at the LA DOTD Pavement Research Facility. A 10-inch thick Portlan cement concrete pavement was constructed. Five sections with total length of 5200 feet across the 2-lane roadway were identified to investigate the narrow transverse contraction joints. The joints were cut in these sections as follows:

1. Section #1: 1000 ft. long, standard widened joint configuration (control section).

2. Section #2: 1200 ft. long, early-entry dry-cut, narrow joints left unsealed.

3. Section #3: 1000 ft. long, conventional wet-cut, narrow joints left unsealed.

4. Section #4: 1000 ft. long, conventional wet-cut, narrow joints sealed, no backer rod.

5. Section #5: 1000 ft. long, conventional wet-cut, narrow joints sealed, backer rod installed.

Pavement Evaluation Phase:
The pavement performance will be monitored for a period of five years by conducting the following measurements:

(a) Ride and joint evaluation.
(b) Pavement noise.
(c) Distress survey.

Cost-benefit analysis. Analysis will be conducted to evaluate the cost-benefit aspects of different types of investigated joints. Different variables will be considered in the analysis, including initial cost, time, and cost of regular maintenance of each joint type.

Implementation Potential

A set of specifications for the investigated concrete joint types will be developed. An implementation plan will be developed in which the candidate joint types will be tried in selected state projects subjected to different environmental and traffic conditions. Those projects will be monitored to evaluate the performance of the pavement and any potential joint distresses/problems. The potential benefits are reduced cost and time spent to perform and maintain the standard type of concrete contraction joints.