



# A STUDY OF FACTORS AFFECTING ROUGHNESS PROGRESSION ON PORTLAND CEMENT CONCRETE PAVEMENTS IN KANSAS

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## Introduction

Portland cement concrete pavements (PCCP) with favorable as-constructed smoothness and lower rates to roughness progression are expected to have longer service lives.

## Project Objective

This study was done to estimate pavement damage due to dynamic wheel loads generated for various roughness levels and also to quantify the effect of as-constructed smoothness and other design, construction, traffic and climatic variables on the rate of roughness progression on PCCP in Kansas.

## Project Description

Selected inventory, construction, climatic and annual roughness data were obtained for 21 PCCP projects. The rate of roughness progression was determined from annual roughness data in terms of International Roughness Index (IRI), and then compared to the selected independent variables to find functional relationships.

## Project Results

The results show that the concrete modulus of rupture, subgrade material, number of wet days, and initial IRI roughness as measured during the first yearly survey after construction significantly affect the rate of IRI roughness progression. Pavements with higher flexural strength tend to retain as-constructed smoothness longer, but overall the as-constructed smoothness does not influence roughness development after 3 to 5 years. Permeable subgrade decreases the rate of roughness progression. Dynamic wheel loads, pavement damage and pavement life correlated little with IRI. Grinding reduces roughness in the short term, but does not lower the rate of roughness progression.

## Report Information

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