



# FULL DEPTH BITUMINOUS RECYCLING OF I-70, THOMAS COUNTY, KANSAS

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By

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## Introduction

Some bituminous pavements on I-70 developed wide, depressed transverse cracks very early in their life. Overlays, patching and sealing were of limited effectiveness and did not prevent crack reoccurrence. Concrete overlays, full-depth recycling and bituminous reconstruction all eliminated or retarded the cracking but were prohibitively expensive.

## Project Objective

Cold recycling of bituminous pavement removes the reflection cracks and costs considerably less, but requires the protection of a hot-mix overlay structural section. A pavement profile that would combine hot and cold recycled sections was estimated to cost as much as 45% less than a full-depth hot recycled pavement. This project was established to evaluate the constructability of techniques that could prevent cracking, the economy of those techniques, and their ability to minimize the effects of fatigue damage, rutting, and nonload-associated cracking.

## Project Description

In 1990, 13 full depth asphalt pavement test sections were built on a portion of I-70 in Thomas County, Kansas. Various combinations of hot mix and cold recycle mixes with different additives were used to build the test sections. Two of the test sections were constructed with a reduced pavement thickness in order to determine how long the thin pavement could withstand the heavy loading of interstate traffic. At least three test sections employed the use of cold recycle material using Class C fly ash, CMS-1 with hydrated lime, and CMS-1 only. The top layers were hot mix, but both an AC-20 and polymerized or modified asphalt was used as the liquid binder.

The test sections were monitored over a period of 11 years. The top layer had severe micro-cracking which was probably due to further hardening of the AC-20. Two seals were placed over the surface in order to prevent raveling. The cost of each test section was determined and the life on at least four of the test sections could be determined. On five of the test sections the pavement life could only be estimated. Based on the initial construction cost and life of each test section, an annual cost of each test section could be determined or estimated.

## Project Results

Based on these annual costs, the field crack/rut survey and Falling Weight Deflectometer measurement, the thicker full depth hot mix test section was judged to perform the best. The thin full depth hot mix had the highest annual cost. The life of these thin sections were determined to be three to five years and were not economically feasible as a means of interstate reconstruction. The cold recycled sections with the different additives performed quite well, with the CMS-1 with and without lime having a lower annual cost than the fly ash section.

## Report Information

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