Pavement Design

Transverse Cracking in Asphalt Pavements

[Tech Brief #004] *August, 2015*

Project Title: Evaluation *of Precut Transverse Cracks for an Asphalt Concrete Pavement in Interior Alaska (Moose Creek-Richardson Highway)*

Principal Investigators
Jenny Liu, PhD, P.E., Professor
Dept. of Civil and Environmental Engineering
University of Alaska Fairbanks
Office: (907) 474-5764
Email: jliu6@alaska.edu

Robert McHattie MCE, P.E.
GZR Engineering
Fairbanks, Alaska

Xiong Zhang, Ph.D., P.E., Assoc. Professor
Dept. of Civil and Environmental Engineering
University of Alaska Fairbanks
Office: (907)474-6172
Email: xzhang11@alaska.edu

John Netardus, Graduate Research Assistant
University of Alaska Fairbanks

Alaska DOT&PF Contacts
Carolyn Morehouse
Section Chief
Research, Development and Tech Transfer
Office: (907) 465-8140
Email: carolyn.morehouse@alaska.gov

Steve Saboundjian, P.E.
State Pavement Engineer
Office: (907) 269-6214
Email: steve.saboundjian@alaska.gov

AUTC Contact
Billy Connor, PE
Director, AUTC
(907) 474-5552
bgconnor@alaska.edu

Study Timeline
2012-2015

Report References
AUTC #: 15.07
AKDOT&PF: T2-13-13
http://www.dot.state.ak.us/stwddes/research/assets/pdf/t21313.pdf

Funding Sources
Alaska DOT&PF
U.S. Dept. of Transportation
Alaska University Transportation Center
PacTrans

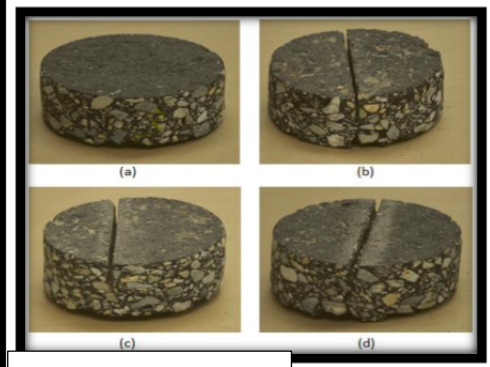
Summary

This study aimed at understanding how major transverse cracks form in asphalt pavement in cold climates and recommends design and construction practices to control thermal cracking in asphalt pavements. Crack surveys and data collection were conducted on Richardson Highway MP 340-346 Resurfacing Project south of Fairbanks to compare various precut strategies with natural major transverse cracks pre and post construction. Preliminary findings indicate that precutting can benefit thermal crack performance of a pavement resurfacing project and therefore reduce M&O costs during a pavement lifecycle.

Problem/Objective

Low temperature cracking is one of the most prevalent distresses found in interior Alaska. Cracks begin appearing soon after construction and influence long term M&O costs (such as sealing and related construction), pavement smoothness, and influence the driving public's perception of roadway performance. The goal is to develop a systemic approach to minimize and control transverse thermal cracks.

Saw cutting post construction



Samples of saw cut depths

Outcomes and Products

-Precutting technology has shown promise in cases where roadway construction has included placement of at least several feet of new material.

-The best performing experimental precut subsection occurred when the precut was placed at a transverse thermal crack location that existed prior to reconstruction and repaving.

-ADOT&PF's Northern Region now has 3 locations with pre-cut thermal cracks, located in a variety of constructed applications for further study and evaluation. Additional years of observation and measurement are required to finalize the design for maximum M&O cost savings.

Implementation

Two additional years of monitoring and evaluation at three Northern Region sites (includes this project's locations) has been selected for ADOT&PF and Center for Environmentally Sustainable Transportation in Cold Climates Research's current funding cycle. Anticipated results for 2017 will indicate a desired spacing, depth, procedures and construction detail for optimal precutting for both designers and M&O.