



Evaluating the Need to Seal Thermal Cracks in Alaska's Asphalt Concrete Pavements



Authors

Robert McHattie, Anthony Mullin, and Juanyu Liu

Date 04/30/2013

Prepared By:

Alaska University Transportation Center
Duckering Building Room 245
P.O. Box 755900
Fairbanks, AK 99775-5900

Alaska Department of Transportation
Research, Development, and Technology
Transfer
2301 Peger Road
Fairbanks, AK 99709-5399

INE/AUTC 12.27

FHWA-AK-RD-12-20

REPORT DOCUMENTATION PAGE

Form approved OMB No.

Public reporting for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestion for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-1833), Washington, DC 20503

1. AGENCY USE ONLY (LEAVE BLANK)		2. REPORT DATE	3. REPORT TYPE AND DATES COVERED	
FHWA-AK-RD-12-20		March 2013	Final Report(8/11/2011-8/31/2013)	
4. TITLE AND SUBTITLE Evaluating the Need to Seal Thermal Cracks in Alaska's Asphalt Concrete Pavements			5. FUNDING NUMBERS DTRT06-G-0011 AUTC Project No. 510005 T2-11-06	
6. AUTHOR(S) Robert McHattie, Anthony Mullin, and Juanyu Liu				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Alaska University Transportation Center P.O. Box 755900 Fairbanks, AK 99775-5900			8. PERFORMING ORGANIZATION REPORT NUMBER INE/AUTC 12.27	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Alaska Department of Transportation & Public Facilities Research, Development, and Technology Transfer 2301 Peger Road Fairbanks, AK 99709-5399			10. SPONSORING/MONITORING AGENCY REPORT NUMBER FHWA-AK-RD-12-20	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT No restrictions			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) The AKDOT&PF has promoted routine sealing of all cracks in asphalt concrete (AC) pavements for many years. In doing so, AKDOT&PF follows the generally accepted "best practice" of sealing pavement cracks to the extent that time and money allows. This study of 91 sites on 20+ year old AC pavements in AKDOT&PF's Central and Interior Regions identified two distinct types of thermal cracks. Both types are known to be ubiquitous on AC pavements throughout all but the most southern parts of the State. Based on the field observations during 2012, researchers conclude that significant maintenance funds can be saved or redirected by not sealing or reduced sealing of thermal cracks in AC pavements. Furthermore, the authors suggest that thermal crack maintenance be significantly reduced without negatively influencing general long-term pavement performance. The report addresses, separately, each of the two recognized forms of thermal cracking. It recommends that "lessor thermal cracking" receive little or no maintenance. The report recommends that maintenance treatment of even the relatively large "major transverse thermal cracks" can be greatly reduced based on inexpensive, long-term assessments following new pavement construction.				
14. KEYWORDS: Cracking (Smfd), Pavement cracking (Smfdp), Pavement maintenance (Fmuhp), Cracking of asphalt concrete pavements (Smfdpb)			15. NUMBER OF PAGES	
			16. PRICE CODE N/A	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT N/A	

EXECUTIVE SUMMARY

INTRODUCTION

The Alaska Department of Transportation and Public Facilities (ADOT&PF) has promoted routine sealing (or in severe cases, patching) of all cracks in asphalt concrete (AC) pavements for many years. Crack sealing is a common maintenance practice for all pavement types in most areas of the United States. In fact, a diligent effort at crack sealing has long been considered one of the chief hallmarks of good pavement maintenance throughout the world. The ADOT&PF has followed the generally accepted “best practice” of sealing pavement cracks to the extent that time and money have allowed, hoping that new technology might someday eliminate pavement cracking, or at least eliminate or minimize certain types of cracking. To date, no paving material or construction innovations used in Alaska have been *confirmed* as improving the long-term outlook for eliminating cracking. Therefore, it is assumed that considerable funds will continue to go toward crack sealing in Alaska.

Accepted “best practice” may not necessarily be *the* best practice after all. This study, which documents careful examination of a selected sampling of Alaska’s AC pavements, concentrated on the colder, dryer interior area of Alaska’s contiguous highway system, where a very high incidence of thermal cracking occurs. A conclusion drawn from this study is that significant maintenance funds can be saved or redirected by *not sealing certain types of cracks*. The process used for selecting study sections is fully explained in the main body of this report.

Based on many field observations made by ADOT&PF research engineers over the preceding 30 years, a conjecture had developed that certain crack types may sometimes be ignored, that is, left completely unsealed for the life of the pavement with no negative effects. The research reported herein represents the first attempt in Alaska to verify or reject this conjecture through a systematic field study of a significant portion of Alaska’s paved highway system.

Only certain crack types are the subject of speculation regarding required sealing. These include the two most common types of thermal cracks found on nearly every paved road in colder parts of the state nominally bound by Tok, Fairbanks, Anchorage, Homer, and Valdez. The shaded area on the following map indicates the general area of Alaska included in the study.