Low Modulus Hot Pour Joint Sealant For ACC Pavements

Final Report for Iowa DOT Project HR-534

Federal Highway Administration Project No. IA 86-08

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LOW MODULUS HOT POUR JOINT SEALANT FOR ACC PAVEMENTS

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DISCLAIMER

INTRODUCTION

Over the years, the Iowa Department of Transportation has established an outstanding network of connector highways across the state of Iowa. Construction and paving of these primary roadways has essentially been completed. Unfortunately, many of these primary highway pavements are reaching their design life and are in need of rehabilitation. The emphasis, therefore, has shifted from the construction of new highways to the maintenance and rehabilitation of existing highways. The Iowa DOT in recent years has become more concerned with preventing the ingress of surface water into the pavement structure. Crack sealing is receiving greater emphasis. Specifications have been modified to require improved low modulus crack and joint sealing materials.

PROJECT LOCATION AND CONTRACTUAL ARRANGEMENTS

The evaluation of this experimental sealant was incorporated into Iowa DOT Maintenance project Jasper County MP-80-1(4)174--76-50. This was a 10.38 mile project on I-80 and IA 146 in Jasper and Poweshiek Counties. Lund, Inc. of Flagler, Colorado, was the successful bidder of this project, let April 1, 1986.

USE OF EXPERIMENTAL SEALANT MATERIAL

The experimental sealant used on this project was produced by W. R. Meadows, Inc. of Elgin, Illinois. It was Sealtight #2486 low modulus, asphalt concrete sealant.

I. General

A. Equipment Used:

Router was a CRAFCO Model 200
Saw was a CIMLINE CRS 25
MELTER APPLICATOR was a B230-20K CIMLINE
Air compressor and sandblaster

B. Material Used: Sealtight No. 2486 experimental low modulus sealant

C. Procedure

1. Cracks were either sawed or routed to a depth of 1/2" to 3/4".

2. Cracks were sandblasted and blown clean with an air compressor

3. Cracks were sealed and certain areas were squeegeed (For additional information refer to the specific area involved)

II. Application of Sealant

A. Area #1 westbound driving lane and 10' shoulder from MP 177.37 to MP 177.65. September 22, 1986, the entire area was routed and blown clean and dry. No sandblasting was done. We began sealing at 12:45 p.m. The mat temperature was 82 F, air temperature 80 F, Material temperature 360 F. The area between MP 177.50 and MP 177.63 was squeegeed. Finished at 2:00 p.m. 1023 lineal feet were sealed.

B. Area #2 westbound passing lane and 6' shoulder from MP 177.65 to MP 166.93. October 9, 1986, the entire area was routed and blown clean and dry. Sealing began at 4:00 p.m. with the entire area being squeegeed. Mat temperature was 66 F. Air temperature was 58 F. The temperature of the material was 355 F. Finished the area at 5:30 p.m. 2235 lineal feet of cracks were sealed.

C. Area #3 eastbound passing lane and 6' shoulder from MP 177.75 to MP 178.05. September 25, 1986, the entire area was routed and blown clean and dry. Sealing began at 3:00 p.m. Mat temperature was 84 F, air temperature 86 F, and material temperature was 360 F. Only the area between MP 177.75 to MP 177.86 was squeegeed. Finished the area at 6:00 p.m. 1999 lineal feet of cracks were sealed.

D. Area #4 eastbound driving lane and 10' shoulders from MP 179.40 to MP 179.68. September 8, 1986, the entire area was routed except for the area between MP 179.55 and MP 179.65. This area was sawed and sandblasted. The entire area was blown clean and dry. Began sealing at 5:30 p.m. Mat temperature 70 F, air temperature 70 F, material temperature was 350 F at the beginning and raised to between 360 -365 F for easier handling. Finished at 7:15 p.m. with 2058 lineal feet sealed.

E. Observation: the material had a very narrow range of pouring temperature although the recommended temperature was 350 -370 F with a safe heating temperature of 380 F. When the material temperature fell below 360 F or rose above 365 F the material began to thicken making it difficult to pour or spread.

PERFORMANCE

The low modulus sealant (LMS) and a comparative convention hot pour sealant meeting 4136.02A were used to seal joints on an adjacent section of I-80 in September 1986. The joints were visually inspected annually for loss of adhesion or cohesion.

Both the LMS and the conventional sealant performed well for two years with no significant failure of either. An inspection of the LMS 2 1/2 years after sealing identified substantial loss of adhesion with much open joint. The LMS even in its poor condition was performing much better than the conventional sealant which had totally failed. The failure of both joint sealants was readily apparent during the wintertime inspections. Iowa DOT Maintenance personnel resealed this section of pavement in 1990 due to substantial failure.

CONCLUSIONS

This research of LMS supports the following conclusions:

1. The LMS performed well for two years without sealant failure.

2. The LMS performed better than the conventional sealant.

3. There was not sufficient improved performance to support a recommendation for further use of the LMS in view of its failure in less than three years.