

STATE OF MAINE DEPARTMENT OF TRANSPORTATION



TRANSPORTATION RESEARCH DIVISION BUREAU OF PLANNING



DATE: JANUARY 2001

EXPERIMENTAL CONSTRUCTION 96-25 and 97-19

EXPERIMENTAL USE OF SAWED AND SEALED JOINTS TO MINIMIZE THERMAL CRACKING

Interim Report - Third Year

INTRODUCTION

“Saw and Seal” is the process of introducing uniformly spaced saw joints to a bituminous overlay in an attempt to eliminate or retard the formation of thermal and /or reflective cracking.

Saw and Seal technology has been experimented with for many years. Several states including Connecticut, Massachusetts, New York, Minnesota and Pennsylvania have used the Saw and Seal method. Although its primary use has been for bituminous over jointed concrete pavements, some states are using Saw and Seal on new construction and bituminous overlays of existing bituminous pavements. In the fall of 1997, the Maine Department of Transportation (MDOT) completed construction on two projects that included Saw and Seal technology in an effort to mitigate thermal and reflective cracking.

PROJECT LOCATIONS/DESCRIPTIONS

Beddington-Deveraux Twp. Project No. F-STP-046P(57)

This project is a portion of State Route 9 located in the towns of Beddington and Deveraux Twp. (see attached location map). The project begins 1.36 miles easterly of the T22 MD town line and extends easterly 4.60 miles. This highway reconstruction included 9 ½ inches of bituminous material. The wearing surface consists of a ½ inch stone C-mix with an AC-20 grade asphalt binder.

The experimental feature of this project consists of three 1,000-foot sections two experimental sections and one control section. Full width sawed joints were introduced using a 30 foot spacing interval from station 70+00 to station 80+00. A 40-foot spacing was used from station 90+00 to 100+00. The control section is located between these two sections from station 80+00 to station 90+00.

T1R6-Sherman
Project No. IM-95-6594(00)E

This project is located on Interstate 95 of the northbound lane in the towns of T1R6, Herseytown Twp., Benedicta Twp. and Sherman (see attached location map). This highway pavement rehabilitation included grinding and stockpiling of the existing 3 inch wearing surface, cold in-place recycling of approximately 8 inches and 4 ½ inches of bituminous overlay. The wearing surface is a ½ inch stone Superpave mix with an AC-20 grade asphalt binder. The project begins 0.06 miles southerly of the Herseytown Twp. town line and extends northerly 9.72 miles.

The experimental portion of this project consists of two 2,000-foot sections, one experimental section and one control section. Full width sawed joints were introduced using a 30-foot spacing interval from station 4150+00 to station 4170+00. The control section was established from station 4170+00 to station 4190+00.

CONSTRUCTION PROCEDURES

Beddington-Deveraux Twp.
Project No. F-STP-046P(57)

The construction process, including the bituminous wearing surface was completed in the experimental area September 10, 1997. The Saw and Seal process began October 2, 1997 at station 70+00. Full width joints (including one foot into each paved shoulder) were sawed to a total depth of 2 ½ inches. A reservoir ½ inch wide by e inch deep was included to accommodate the sealant (see Figure I). This cutting was accomplished in a single pass using a “wet cut” pavement saw. After the correction of several problems associated with the Sawed and Sealed joints, this experimental feature was successfully completed October 23, 1998. Although air temperatures during this second phase of installation were below the 50-degree minimum, installation was allowed to continue. Bond breaker tape was used in each joint and in some instances a double layer was applied to assure the sealant remained in the reservoir.

T1R6-Sherman
Project No. IM-95-6594(00)E

The bituminous wearing surface in the experimental section of this project was completed October 1, 1997. The Saw and Seal procedure began October 16, 1997 at station 4150+00 and was completed October 17, 1997. Sawed and sealed joints were introduced using the same methods as the Beddington-Deveraux project with two exceptions. The contractor was not required to use a heat lance or bond breaker tape for acceptable completion of this projects experimental feature. Although air temperatures were also below the 50-degree minimum for the Saw and Seal portion of this project, work was allowed to continue.

FIELD INSPECTION SUMMARY

The third annual field inspections were completed October 2 and 4, 2000 for projects Beddington - Deveraux and T1R6 - Sherman, respectively. Each project continues to perform very well. No transverse cracking was present in either the experimental or control areas within each project. Joint sealant appeared to be in good condition on both projects, with no significant separation from the edge of joints. As stated in the Construction report, sealant performance was of particular concern because of low air temperatures during its application. After nearly three years of service, it appears these temperatures had no adverse effect on the sealant.

One concern identified during these inspections were cracks extending from the end of the sawed joints into the paved shoulders. This was noticed in each project; however, the T1-R6 project has a much higher number of these cracks and their severity is also greater (see attached photos). Sawed joints were measured and found to be the recommended one-foot into the paved shoulder for the Beddington-Deveraux project. For the T1-R6 project, the sawed joint did not extend into the paved shoulder as recommended. This was probably due to the presence of a rumble strip at the edge of the travel and passing lanes, which limited the sawing process. It appears this may be the cause of the above-mentioned increase in number and severity of these cracks.

A cursory visual evaluation was also completed on each project in late March 2000. Even during this "cold weather" evaluation, no transverse cracks were present. Sealant remained pliable and well adhered to the sawed joint edges.

FUTURE FIELD INSPECTIONS/REPORTING

The next scheduled field inspections are for the fall of 2001. A more detailed evaluation of the crack extension at the end of sawed joints will be performed at that time. The result

of these evaluations and any other findings will be published in the form of the fourth year interim report.

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Distribution B

Other Documents Available:

Construction Report - January 1998
Interim Report - First Year October 1998
Interim Report - Second Year August 1999

T1R6-Sherman



Edge of Travel Lane



Edge of Passing Lane

FIGURE I

Typical Joint Section

