

MINIMIZATION OF REFLECTION CRACKS
INSTALLATION REPORT — RT. 29 N. CHARLOTTESVILLE

by

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Virginia Highway Research Council
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PREVIOUS WORK

For the past two years the Bituminous Section of the Highway Research Council has been seeking methods of minimizing reflection cracking in both rigid and flexible pavements. Last year four experimental projects were installed using a single high tensile strength stress-relieving layer of a proprietary material (Petromat).⁽¹⁾ The results on the three bituminous pavements included in the experiments were sufficiently successful that the study was continued this year. The results on the previously overlaid concrete pavement (Rt. 460) in last year's work were not particularly successful, due primarily to vertical joint movements that caused a shearing of the overlay and subsequent cracking within three months of the construction.

1972 INSTALLATIONS

In mid-July 1972, three different materials were placed in a section of the NBTL of Rt. 29 north of Charlottesville at the northern entrance to the Hollymead subdivision. Figure 1 shows the location of the materials.

This section of roadway was chosen because of the poor condition of the surface as typified in Figure 2. The areas preceding and following the test section were patched by maintenance forces prior to application of the overlay. The experimental portion was not patched so that the stress-relieving materials could be placed on a severely cracked surface to provide a very thorough test of their abilities to retard reflection cracks.

(1) Hughes, C., Petromat Installation Report, Virginia Highway Research Council, March 1972.

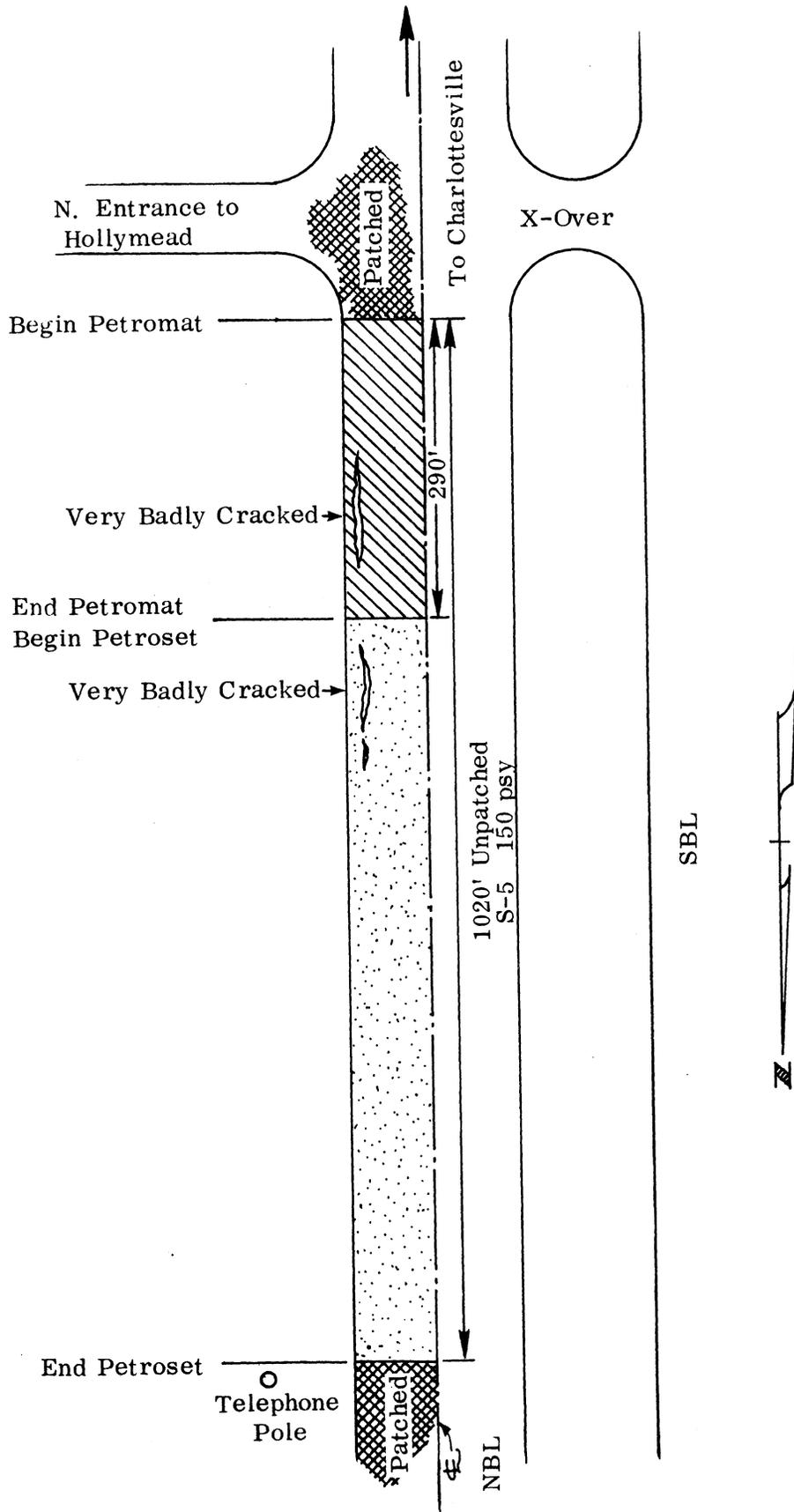


Figure 1. Schematic diagram of 29N test installation.

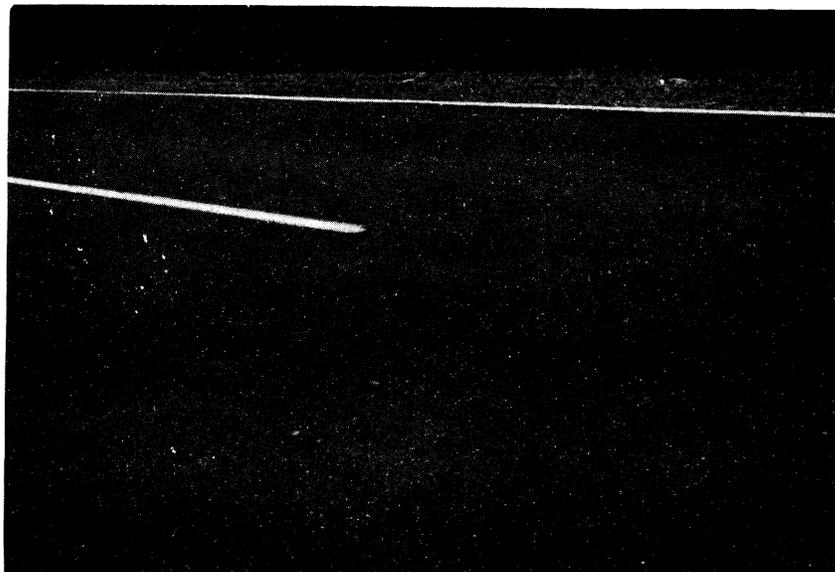


Figure 2. Typical crack pattern of test section.

MATERIALS AND APPLICATIONS

Prior to placement of the Petromat material (an unwoven polypropylene fabric), a CAE 2 tack coat was shot at about .2 gsy and allowed to cure a little over an hour. Because of time limitations imposed by the application technique, the tack coat probably was not allowed to cure as long as would be desirable, even though the weather was hot. The Petromat was placed very easily in a 12-foot width.

The second material used was an unwoven, spun bonded nylon (Cerex — 2.5 oz./yd.²). The same rate of tack was used for this application, and the material was placed in two 60-inch wide strips. This application did not appear to be as satisfactory as a single wider width because of the number of free edges and lack of continuity across the entire width.

Because both of the fabrics were placed late in the day and the overlay would not be applied before the next day, both sections were thoroughly sanded so that traffic would not disturb the material to any great extent. However, when the sand was placed on the Cerex some wrinkling was observed.

On the day following application of the fabrics, paving was started in the NBPL. This required the NBTL to handle all traffic, which consequently traveled over the Petromat and Cerex. Possibly because of the hot weather, the traffic tore the last (northernmost) 10 feet of the Petromat and wrinkled the entire Cerex application so badly that these areas had to be removed. However, no trouble was encountered in overlaying the remaining Petromat material with 150 psy of S-5 mix.

The following day Petroset - AT, a high molecular weight emulsified rubber compound, was used on the section originally having the Cerex and extended an additional 420 feet. The Petroset as received was cut with two parts water and the diluted mixture applied at the rate of .15 gsy, which according to the manufacturer provided about 1.0% rubber in the mix. A spray tank had been obtained to apply the diluted mixture, however, it was found that because of the emulsion properties the diluted mix could not be pumped. Therefore it was sprayed onto the pavement under a gravity flow through a single hose. This situation was certainly not ideal and the mixture was not applied as uniformly as desired. After application the material soaked through the overlay in about 15 minutes and created a glossy finish. Although there did not appear to be any slipperiness problems, the section was sanded as a safety precaution.

Skid tests were performed in early November and excellent results were obtained on all of the sections. The section with Petroset averaged 56.4 and the control section had an average skid number of 60.9.

PERFORMANCE

As would be expected, no cracking is yet visible in either the test sections or adjacent areas. However, in keeping with normal Council policy, the sections will be examined from time to time and their performance reported to the Bituminous Research Advisory Committee when appropriate.

FUTURE WORK

It is anticipated that additional sections will be applied next year, with the particular objective of solving the problems encountered this year with the Cerex and the Petroset.