STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

TRANSPORTATION RESEARCH DIVISION
BUREAU OF PLANNING

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EXPERIMENTAL CONSTRUCTION PROJECT ME 01-3

CONSTRUCTION REPORT

EXPERIMENTAL INSTALLATION OF GEOSYNTHETIC PAVEMENT REINFORCEMENT TO REDUCE REFLECTIVE CRACKING

RUNWAY 17-35 OVERLAY, AUBURN/LEWISTON MUNICIPAL AIRPORT SAIP11.7001(33)

INTRODUCTION

This project investigates the performance benefits of geosynthetic pavement reinforcement fabric used to reduce reflective cracking on an airport runway. The project was part of the runway overlay program administered by MDOT. That program, due to budget constraints, treats about three runways per biennium. This project involves one runway at the Auburn-Lewiston Municipal Airport that was paved with a 40 mm lift of Superpave hot mix asphalt (HMA) on October 20-23, 2000. The geosynthetic fabric was placed prior to the pavement overlay to investigate whether it would extend the service life of the overlay.

BACKGROUND

Due to severity of pavement cracking on this runway several alternatives were considered during the planning of this project. The pavement had been treated with crack sealants numerous times in the past. Full pavement rehabilitation (removal and replacement) was ruled out due to budget constraints. It was determined that an HMA overlay, similar to those done at other airports in previous years, would be used. In addition, a geosynthetic reinforcement fabric would be applied to the transverse cracks prior to paving, to help control reflective cracking. Simple overlays have generally worked well on similar airport surfaces in the past.

MDOT has used geosynthetic pavement fabric in some experimental highway projects. While the results of those applications are still under investigation, the products show some early potential to retard reflective cracking.

CONSTRUCTION

On this project a full width layer of fabric covering the entire runway would have cost as much as the overlay itself. In an effort to reduce the cost of crack reinforcement for similar future projects the fabric was not installed on the full width, but was applied “band-aid” style on the transverse cracks. In addition, the roll of fabric was split in half for a portion of the overlay, reducing the width of the coverage. The half width sections of fabric were used on about 815 feet of the southerly end of the runway. The full width (1.5 m) sections were used on the remaining portion of the test area. The material used was GLASGRID #8502, a fiberglass reinforcement with an elastomeric polymer and a pressure sensitive adhesive backing, having a grid size of 12.5 mm, and weighing 560g/m^2. A control section was placed on a portion of the runway lying north of the main runway intersection. The control section consists of an overlay with no fiberglass reinforcement.

The original plan was to place a single 40 mm lift of HMA, but as the first paving lane was placed problems surfaced. It appeared that the crack sealant reacted with the HMA as it was compacted, liquefying and holding heat, so that a “bubble” was formed above the crack. This led to shoving or creeping as the HMA compaction continued. Two paving lanes were placed with the full depth overlay, as the contractor tried various compaction techniques to alleviate the problems. However, none of the techniques worked, and in the end a 15 mm shim lift was placed on the remainder of the runway width. Also, the contractor was directed to mill the two lanes placed full depth back to 15 mm in preparation for placing a 30 mm wearing course of HMA over the entire width of the runway. After placement of the shim the remainder of the project went smoothly. The milled area extended over the westerly 24 foot portion of the test area, from the south end to the intersection with the main runway.

MDOT has occasionally encountered similar problems on highway overlays. The problem seems to occur most frequently where a wide overband of sealant covers the crack area. In these cases a shim lift has been used effectively, and it appears that allowing the shim to cool before placing the wearing surface stabilizes the sealant material. Another option would be to mill 6-7 mm off the surface of the cracks, thus removing the sealant overband.

A problem was encountered with fabric adhesion in a few areas. The contractor made a few passes with a rubber tire roller after placing the fabric, but apparently did not roll it enough to fully activate the “glue” intended to make the material stick to the surface. A more thorough job of rolling might have prevented these problems, but even as applied the fabric only lifted in a few areas, and adhesion was only a minor problem. Construction techniques are shown in the series of photos on the next pages.

DATA COLLECTION

Prior to paving, the location of the fabric was videotaped and documented with the Department's Automatic Road Analyzer (ARAN). The videotapes taken by this method provide a means for accurately documenting the position of the fabric installation. In future years successive ARAN tapes will be compared to determine if reflective cracking has been reduced.

SUMMARY

Because of the construction problems, the effectiveness of this test will be somewhat compromised, especially on the two westernmost paving lanes. However, the test area will be monitored along with the control. In the future airport overlays will be accomplished with a 15mm shim and a 30 mm wearing surface where large cracks with extensive sealing are present.

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REVIEWED BY: Dale Peabody

List of Photos

Figure 1

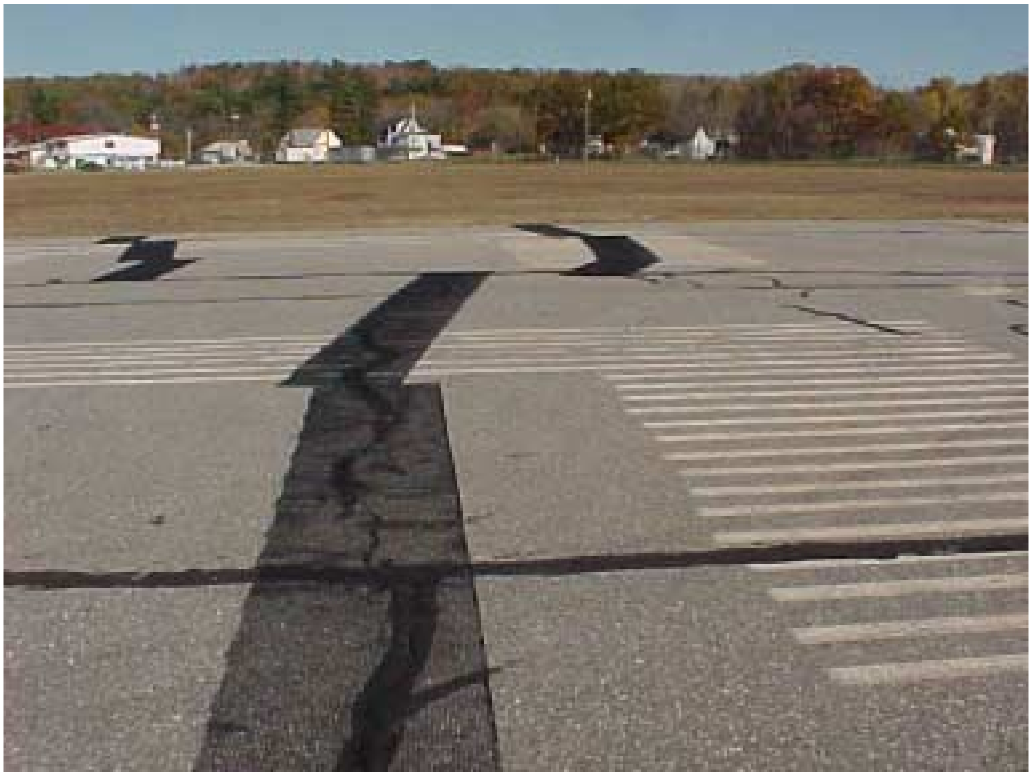
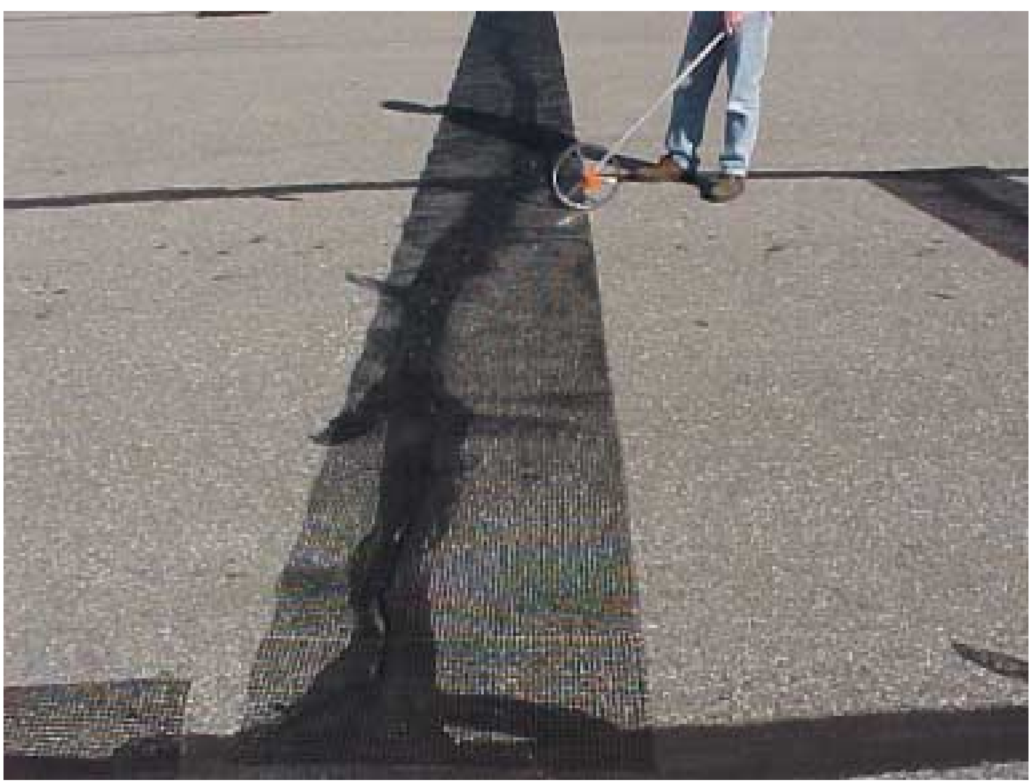


Figure 2

Figure 3



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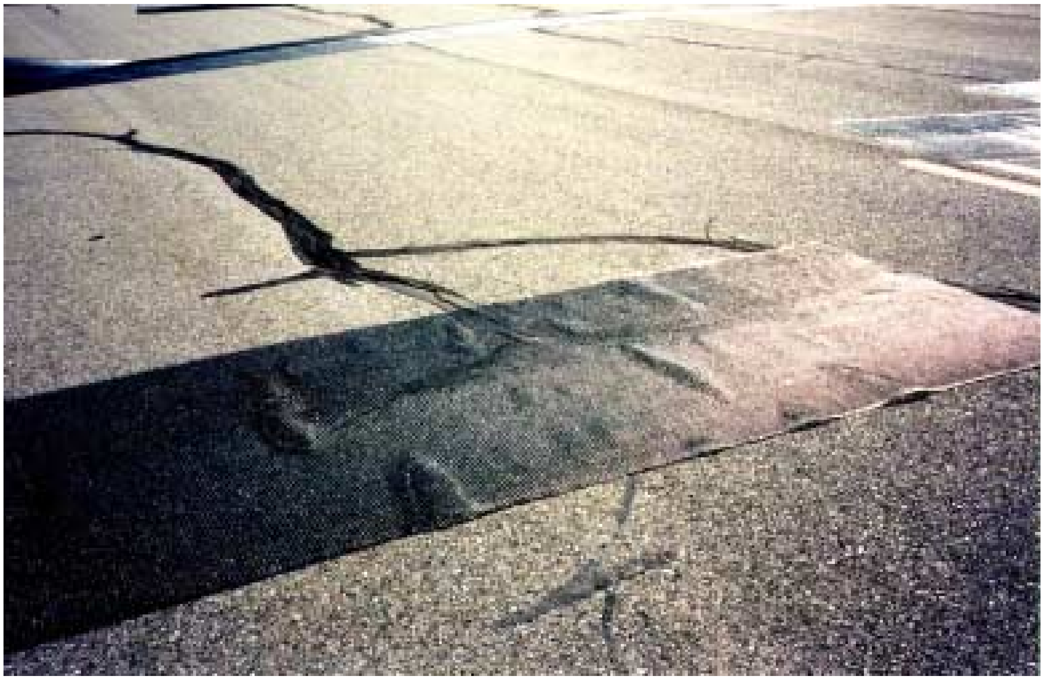
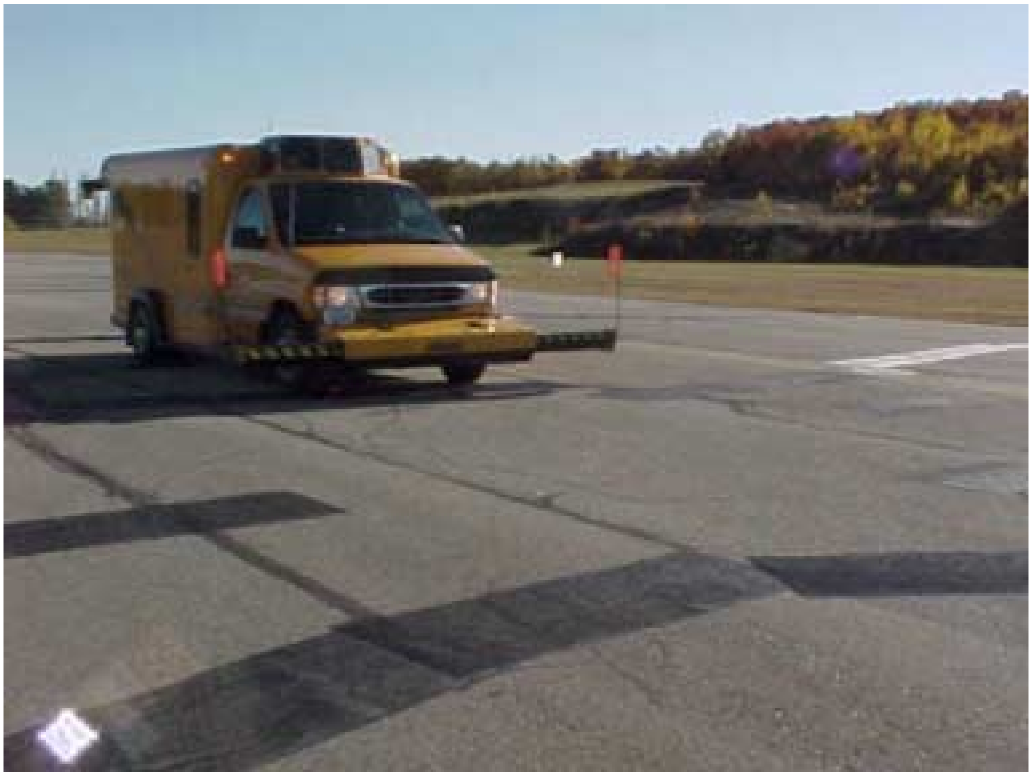


Figure 5

Figure 6



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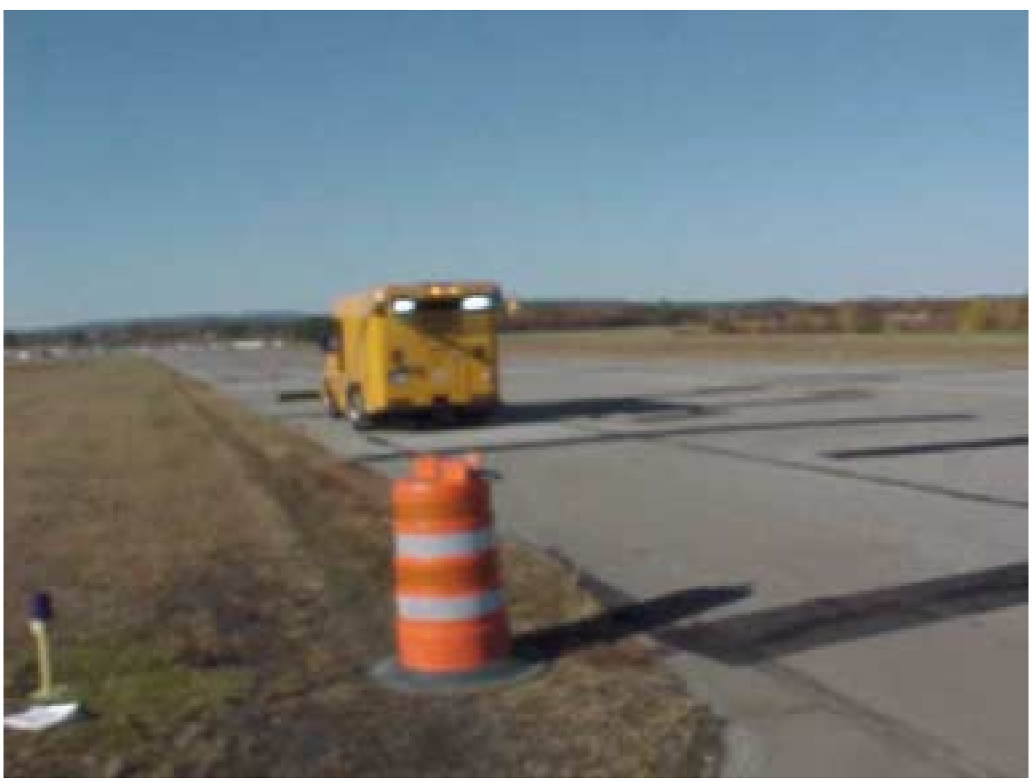


Figure 8

Figure 9

Figure 10

Figure 11

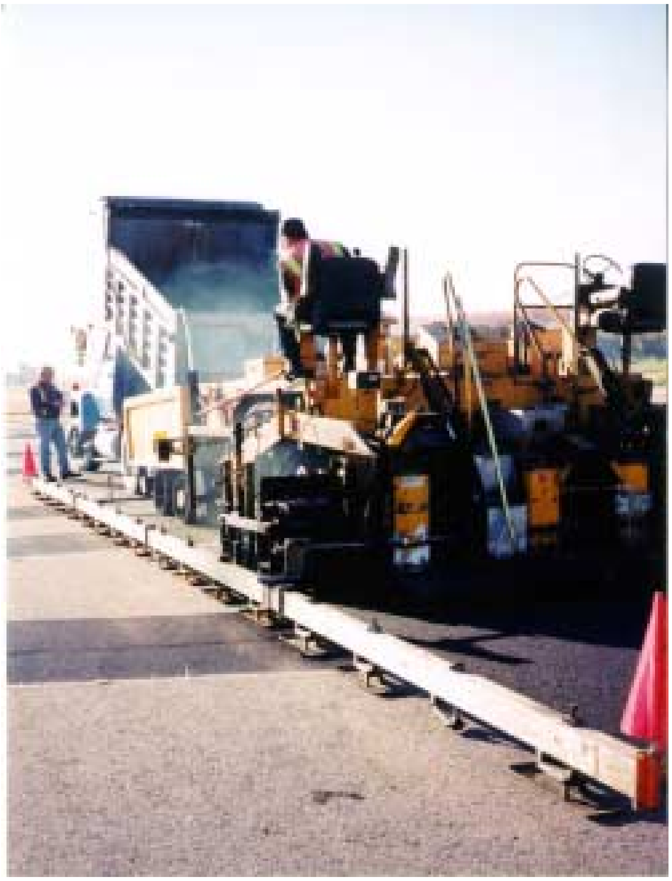


Figure 12

Figure 13

Figure 14

Figure 15

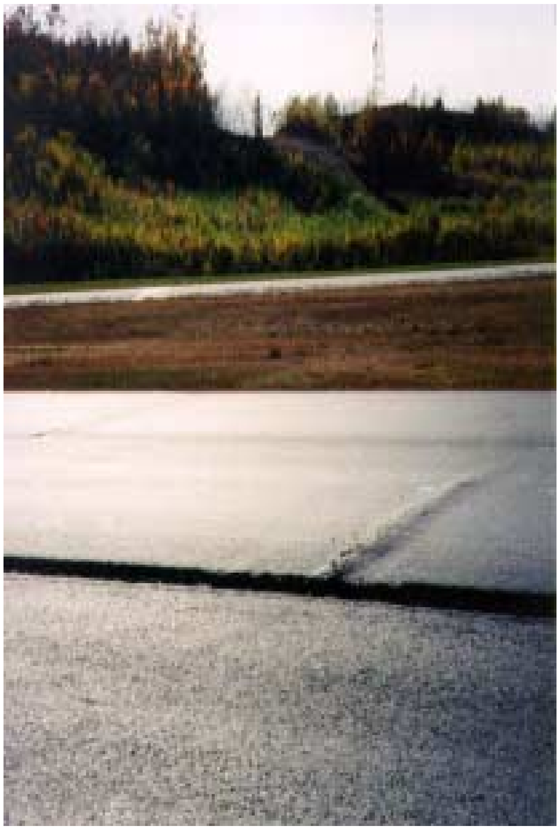


Figure 16

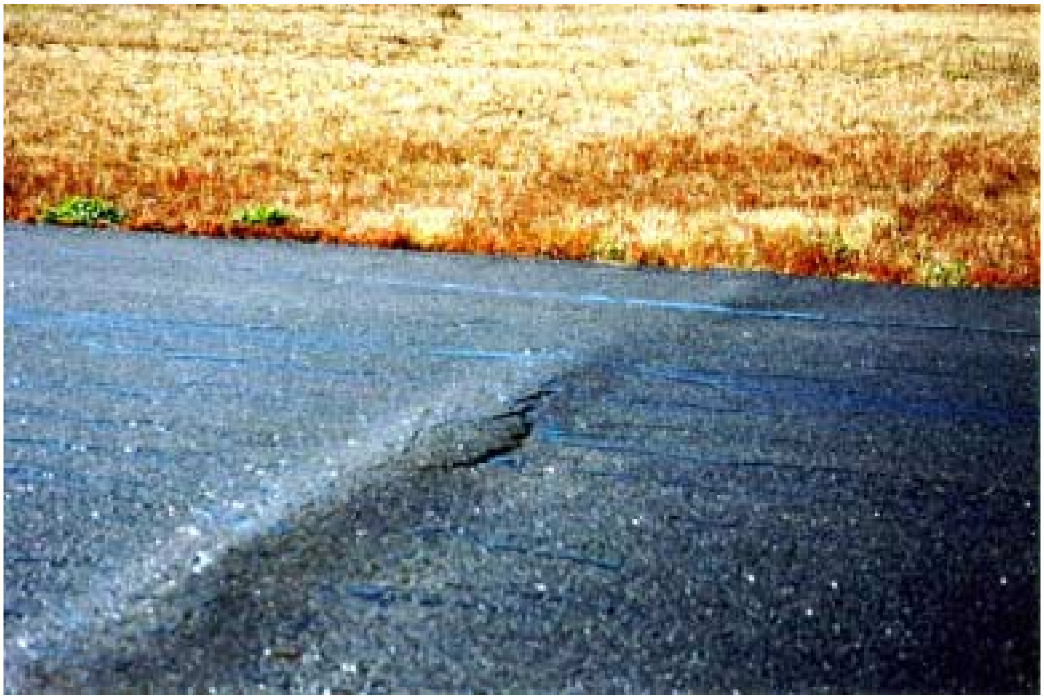
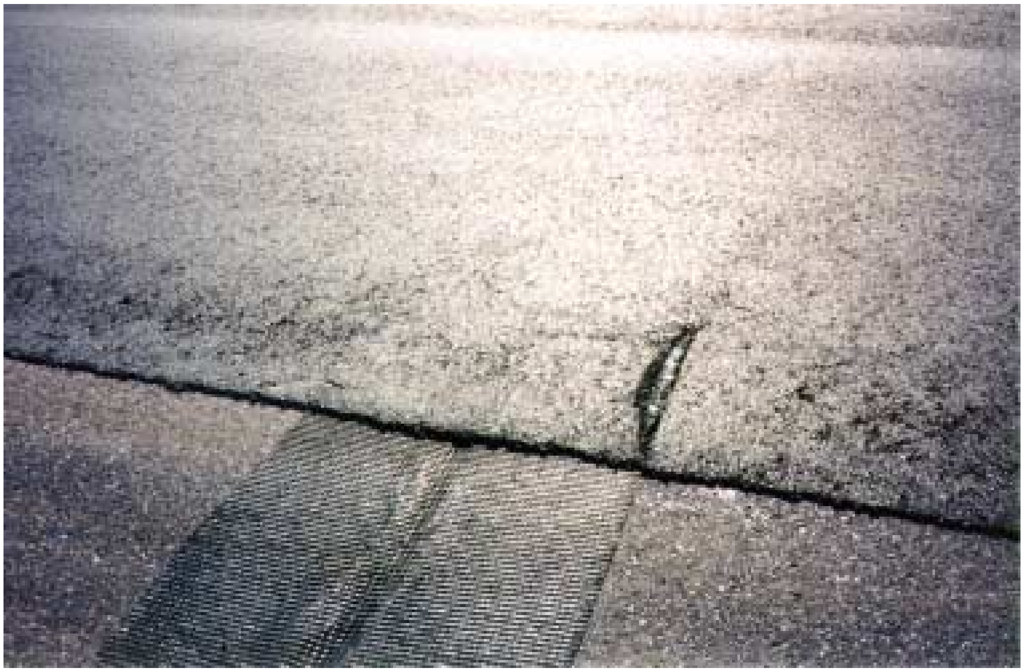


Figure 17

Figure 18



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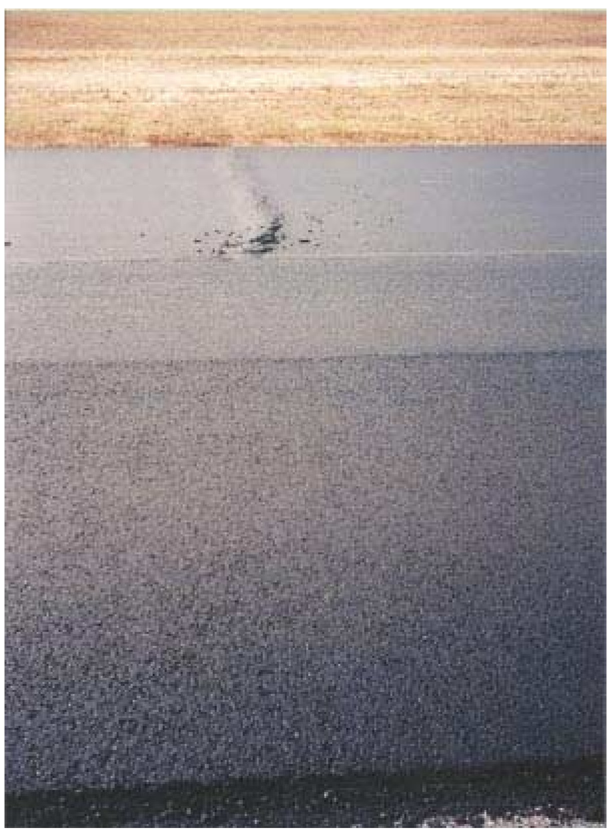

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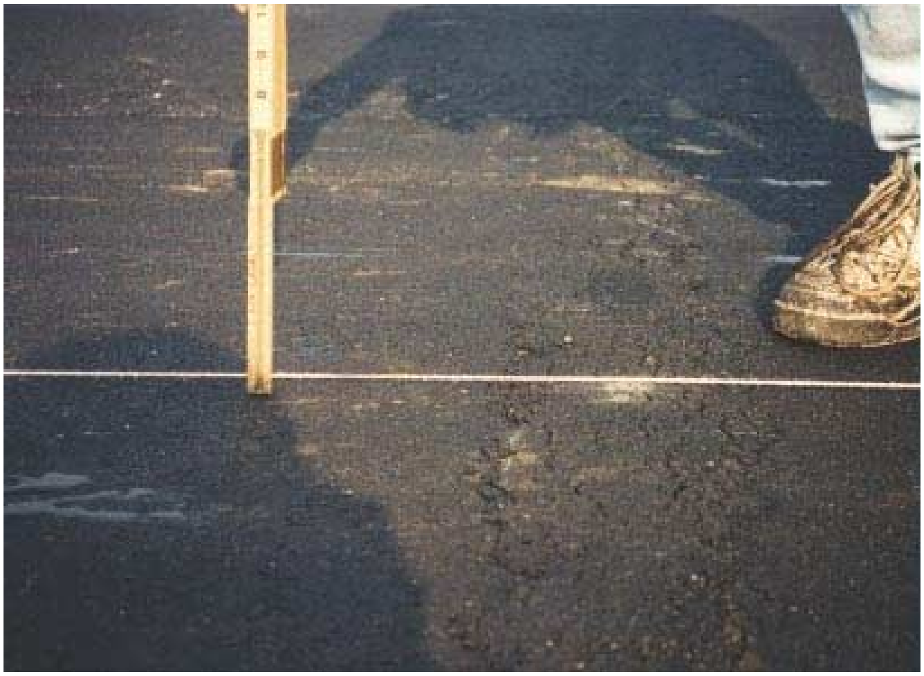

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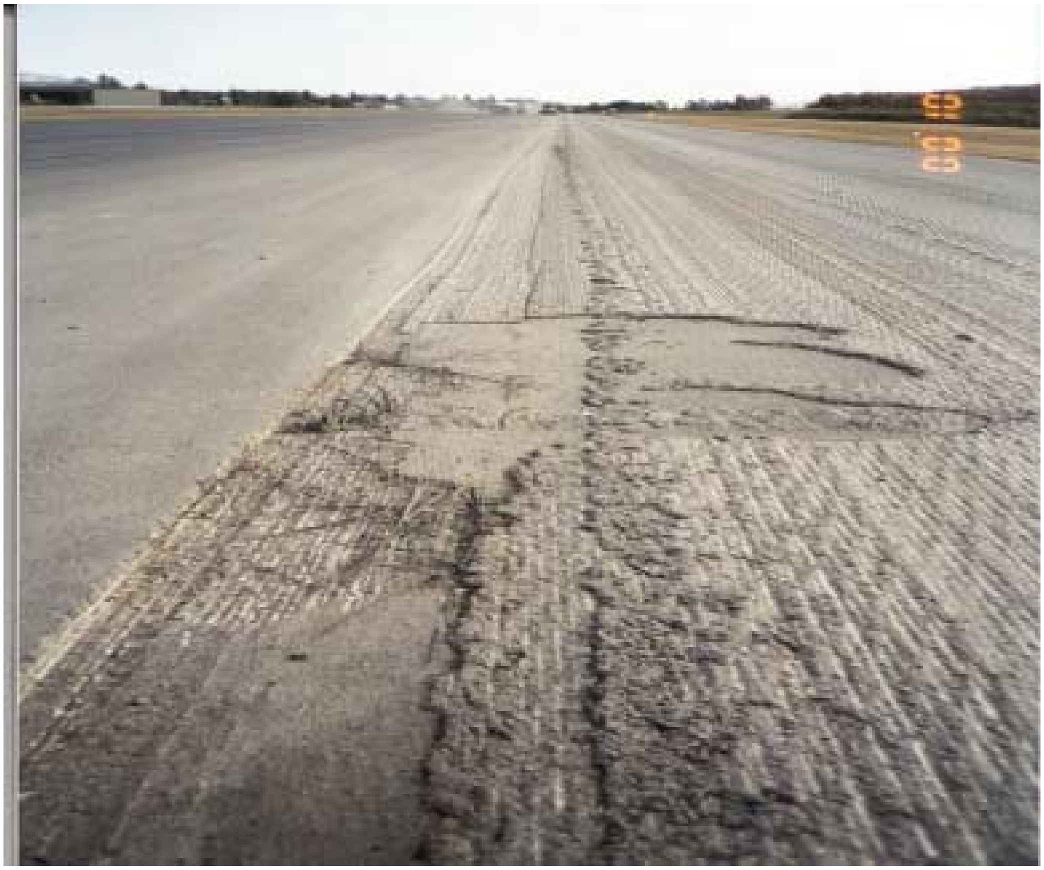

Figure 22