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16. Abstract Asphalt roll roofing was first used for crack repair in the summer in 1977. This report describes the experiences of District 8 (Abilene) with the process. The procedure is described in step-by-step detail, accompanied by photographs. Some results and comments are: 1) roll roofing patches will not bleed through hot mix overlays; 2) pot holes do not develop as quickly as with other methods; 3) no special skills are needed by the maintenance crew to place the patches, and more cracks can be patched by this method than can be poured (1050 yd ² /day versus 350 yd ² /day of premix patches); 4) the cost is less.					
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MAINTENANCE
PAVEMENT CRACK REPAIR
USING
ASPHALT ROLL ROOFING MATERIAL

by

Temple R. Kennedy
State Department of Highways
and Public Transportation



Special Study Report
SS 15.14

May 1979

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DISCLAIMER

The opinions expressed and the conclusions reached herein are those of the author and do not necessarily reflect the views of the State Department of Highways and Public Transportation.

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"MAINTENANCE PAVEMENT CRACK REPAIR USING ASPHALT ROLL ROOFING MATERIAL"

BY: Temple R. Kennedy

Research Operations Engineer
May 1979

INTRODUCTION:

Pavement crack maintenance, crack sealing, and crack patching of asphalt pavements is a time-consuming, costly, and continuous operation. There have never been sufficient funds, personnel, or equipment to keep all cracked pavements repaired. Much of the crack maintenance work is of a temporary nature intended to last until permanent repairs can be made. Maintenance work of this nature is usually continuous in most sections from early spring until fall when weather conditions halt asphalt use. Hopefully by that time the crews will have the cracked sections in suitable condition to last through the winter. The work may include crack pouring, asphaltic premix patching, and seal coating short sections or strips. Where cracks are not repaired or sealed, surface water enters the pavement, softening the base and subgrade which reduces the strength of base and



Typical Cracks To Be Repaired

pavement layers. The reduced strength and support value causes further deformation, severe alligator cracking and then pot holes. The previous photograph illustrates a severely cracked pavement.

THE BACKGROUND IDEA

In District 8, Abilene, Mr. Bob Lindley had noted several years ago that asphalt roofing shingles which had blown off a lumber truck stuck on the pavement and could not be pulled up. He also noted that those which fell over cracks did not allow the cracks to reflect through. Asphalt roll roofing was first used in the summer of 1977. The results have been very good and crack patches have been made with the asphalt roofing materials in Mitchell, Jones, Taylor, Howard and Borden Counties. The demand or usage has been greater in Mitchell County where Paul Logsdon and Gaylord Price, Maintenance Construction Supervisor and Foreman respectively, place great faith and confidence in its effectiveness and economy.

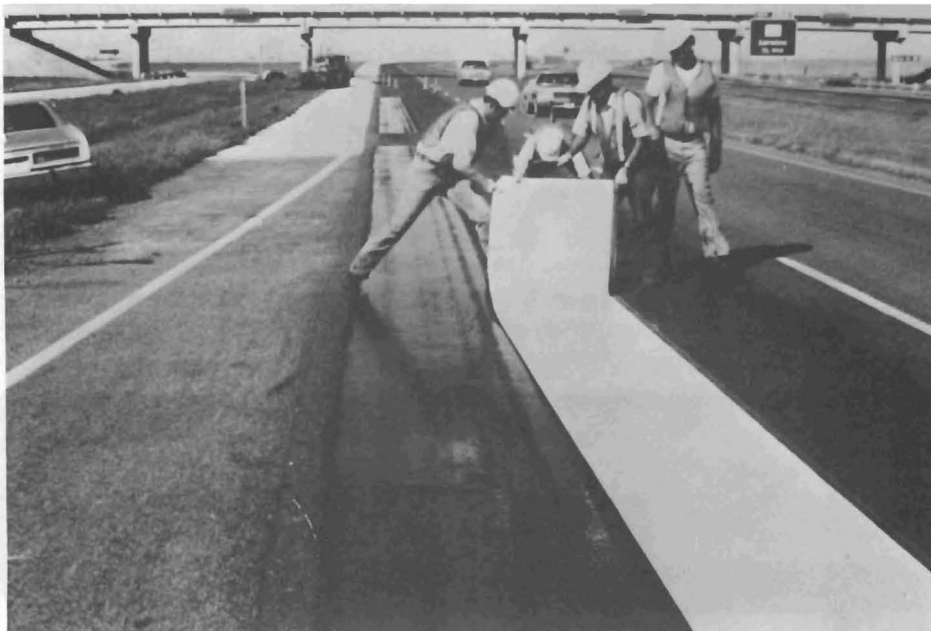
THE PROCEDURE

The construction procedure which the Mitchell County maintenance section has determined to be most effective follows: First the area to be patched is tacked with with emulsion. About one-tenth (1/10) gallon per square yard of EA-11M is used. They prefer the emulsion as a greater volume can be used than could an asphaltic cement and cut-backs have not worked too well. The greater amount of emulsion insures that it gets into the cracks for better sealing.

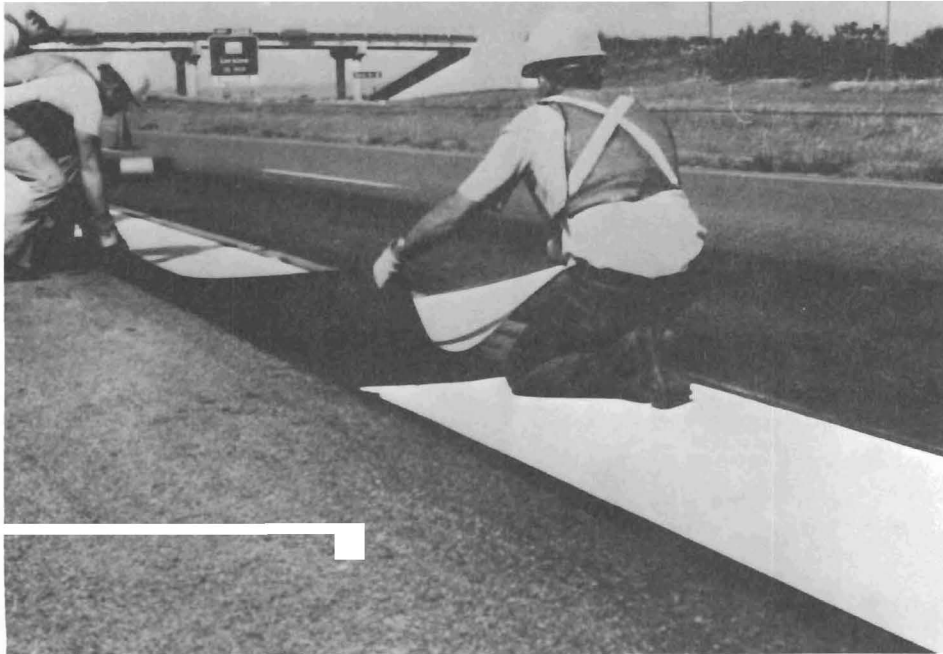


Shooting EA-11M Tack Coat

After the emulsion "breaks" and the water is out, the asphalt roofing is rolled out by hand onto the patch area; it is "walked down" and the dump truck can then be used to "bull wheel" it in. Once a few cars or trucks have rolled over, it can't be pulled up.



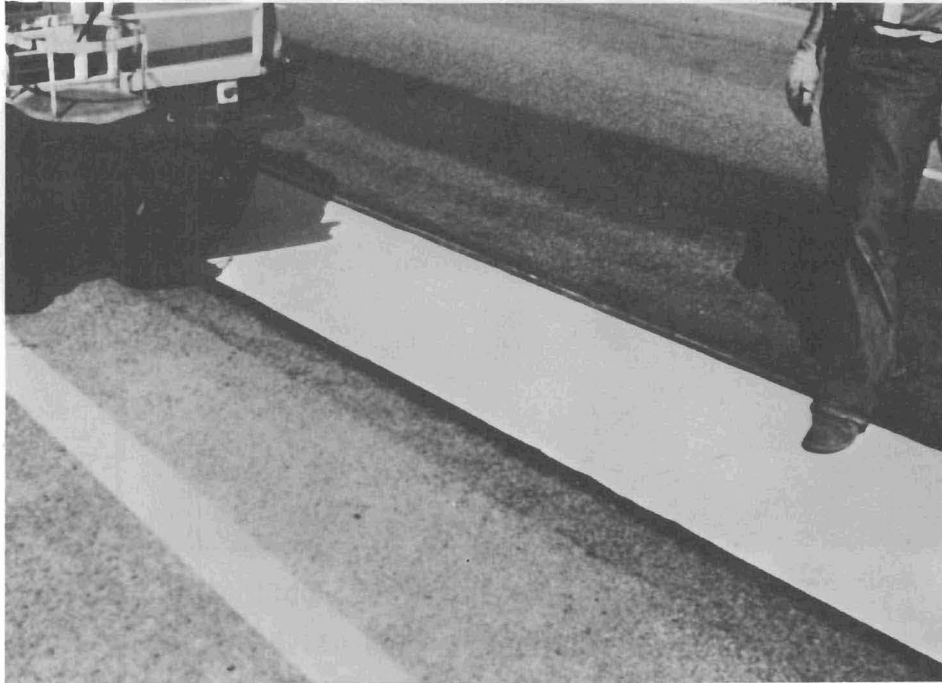
Rolling out the Asphalt Roofing Material



Placing Rolled Roofing Material

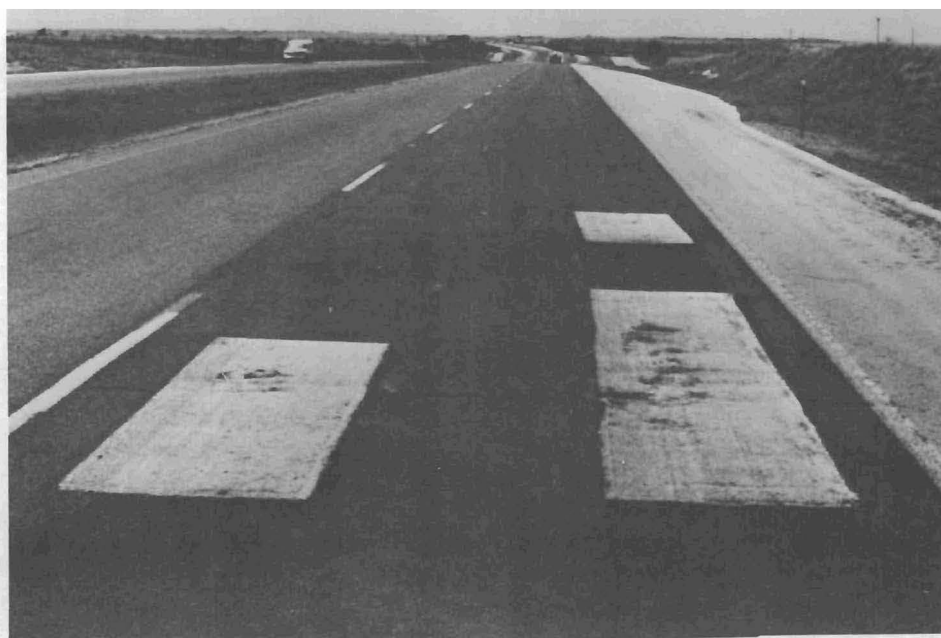


Placing and Walking down Rolled Roofing



"Bull Wheeling" The Roofing Material Down

District 8 has used both white and brown colored rolled asphalt roofing for patches. They prefer the brown tone as there is less contrast with the existing pavement and the patches blend in better.



Completed Patches Using White Roofing



Completed Patches Using Brown Roofing

The main use of rolled roofing for patching has been in sections with alligator cracks in the wheel path. These cracks will develop chuck holes or pot holes if not maintained. Where rolled roofing patches have been made, no pot holes have developed. This method is quick and there is less danger to maintenance personnel. Below are photographs of a badly alligatored section. The tack coat for repair is being applied with a hand-held sprayer. In the patch, the outline of the cracks shows through. However, after 1½ years some cracked through the material and pumped.



Badly Alligatored Pavement



Applying Tack



Patch in Place 1½ Years

It is important that all cracks be covered or others that lead into the area to be patched be sealed. If not, water may get under the patch from those cracks outside the patch and cause pumping and damage to the patch. Indentations will appear at the cracks but the roofing will still be doing the job of keeping moisture out of the base. With some wide cracks the roofing compound is spread in the crack before the roofing is put on; therefore providing a seal. The rolls of material are 36 inches wide and 36 feet long. Where it is necessary to place material side by side or end to end only one or two inches of lap are needed. Below is an example of a completed patch about six feet wide and eighty feet long.



Completed Patch

EXPERIENCES AND COMMENTS:

From District 8's experience they note these benefits and comments:

1. Roll Roofing patches will not bleed through hot mix overlays.
2. Pot holes do not develop as quickly where they put down roll roofing as they do with other patching methods.
3. They can place so much more roofing patches than they can pour cracks and appearance is better. Crack pouring is messy, slow, expensive, and ineffective.
4. Mitchell County plans to use as much or more than last year and will use in all cases under level-up patching operations.
5. The work must be done in the summer like most "good" asphalt work.
6. Where they have a flushed slick section, a strip placed in the wheel path will practically eliminate the hazard. During warm weather, very little tack is needed. In some cases roofing compound is applied only around the edges and in a few other spots to stick it down.
7. An ordinary maintenance crew can place roll roofing while it takes a more skilled crew and special equipment to use other commercial fabrics.
8. They tried another commercial fabric without success since it was not covered by aggregate. In their estimation there was no comparison between the two.
9. After the patches are placed they prefer to let it "cure" about two hours before opening to traffic. One hour is considered the minimum curing time.
10. A three-man crew can place about 1,050 square yards per day of roll roofing patch while they can only place about 350 square yards per day of premix patch.
11. The costs of rolled roofing patch has been about \$1.33 per square yard in place compared to about \$1.70 per square yard in place for premix patches. Costs may be a little higher now due to labor and equipment but the roofing costs are the same.
12. Where they plan to overlay or put premix over roll roofing patches, the roofing should be placed a few days before the overlay. Three weeks curing is about the optimum. Cracks will come through where roll roofing is not used, but doesn't where it is used.
13. After the patches have been in place some time, the aggregate begins to wear off and smooth out. Skid resistance may become lower.
14. They consider roll roofing patching an excellent maintenance tool.

RESULTS:

The district realizes this is a temporary maintenance procedure. They use it to "buy time" to prevent a road from completely coming apart until more permanent rehabilitation work can be done. They anticipate the life of the patches to be one year; however, some may serve for two - three years over small cracks. In this time of insufficient funds, lack of equipment and skilled personnel, "buying time" until permanent repairs can be funded and scheduled is extremely important.

In Mitchell county they had more freeze damage the past winter than Mr. Logsdon can ever remember having before. They had down a large amount of roofing patches on IH 20 on both sides of Colorado City. He says that it really helped - no pot holes.

ANOTHER USE:

In addition to patching with asphalt roll roofing they have experimented with one other application of the material. They have placed trial field installations of standard pavement markings of the material at railroad - highway grade crossings. The district sign shop cuts the letters and strips and they apply them. After the roll roofing letters, stripes, and crosses are placed they apply paint and beads. They appear effective; however, it may take 2 or 3 paint and bead applications for them to stabilize. Hopefully they will last longer and be more effective than only paint and beads or thermal plastic applications.



Completed Railroad-Highway Crossing Markings

SUMMARY:

In summary the present District 8 evaluation of roll roofing patchings is that it is effective, economical, fast, does not require highly skilled labor or special equipment and buys time for permanent repairs. In essence a very effective maintenance tool.