

A Study on the Use of Fabric to Retard
Reflective Cracking Over Widened Joints

Interim Report
for
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DISCLAIMER

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ABSTRACT

Reflective cracking of asphalt resurfacing has been a concern for a long time. Years ago wire mesh was used to control widening cracks. More recently it has been fabrics or fiberglass.

In 1986, part of the proposed fabric was deleted from projects in different parts of Iowa with various histories and designs.

These projects were monitored in 1988, 1989, 1990 and 1992 with only the thin (3 inch) overlays on newly widened pavements showing a significantly greater percentage of cracks in the areas where the fabric was deleted.

INTRODUCTION

Much of Iowa's primary road system was paved prior to World War 2 with paving widths of 18 and 20 feet. After 1950 most of these highways were widened with either Portland cement concrete or hot mix asphaltic concrete before resurfacing.

Over the years various methods have been tried to control the reflective cracking of the joint between the widening and the original pavement. If the reflective cracks can be prevented or controlled, it would improve the riding qualities and reduce the intrusion of water into the subgrade. At one time, wire mesh was used. More recently fabric has been placed over the widening joint to prevent or retard reflective cracking.

In 1986, nine projects were let in which the proposed fabric was deleted from 10% of the project. These were generally in 1/4 mile segments on either or both sides of the pavement. These projects are located on US 71, Cass County in southwest Iowa; US 6, Johnson and Muscatine Counties in southeast Iowa; US 169, Dallas and Boone Counties in central Iowa; US 169, Webster and Humboldt Counties and Iowa 17, Wright County in north central Iowa; Iowa 60, Osceola County in northwest Iowa; and US 218, Mitchell County in northeast Iowa. On another project (Iowa 17 in Hamilton County) constructed in 1981, the fabric was omitted from the north one mile.

Five projects included widening, four projects were on previously widened pavements. The tenth project was partially on newly widened pavement and partially on previously widened pavement and is treated as two separate projects for that reason. All of the binder mixes were Type B. Eight of the surface mixes were Type A and three were Type B. Of the 22 mixes (binder and surface) eleven were all virgin mixes and eleven contained recycled material. Five of the projects were resurfacings of p.c.c. pavement that had not been previously resurfaced and six projects had been previously resurface with asphalt. Of these six, five were milled and a fabric placed on the milled surface prior to resurfacing. The nominal thickness of the resurfacing on six projects was 3 inches, on two projects 4.5 inches, two projects 5.5 inches and on one project the thickness was 6 inches. The fabric used was Phillips Petromat, except the 1981 project which had DuPont Typar placed on 2400 feet.

INSPECTION PROCEDURE

The percentage of reflection cracking in the areas without fabric was estimated after walking the entire length of the section. Transverse, centerline and quarterpoint cracks were ignored. Where the fabric had been omitted on only one side of the road the opposite lane and some adjacent pavement was also inspected. Where the fabric had been omitted from both sides and cracking was observed, similar adjacent areas were inspected. If no cracks were observed only spot areas of pavement with fabric were inspected.

RESULTS

At the age of about 5 years only five of the projects have significant reflective cracks over the widening joint. The non-fabric areas have cracked more than the areas with fabric. None of the projects with more than 3 inches of new overlay has any significant cracking. Only two projects that had been widened in a previous contract showed significant cracking and with one of those it was relatively minor. The one project with only 3 inches of additional overlay that did not crack has rutted. On some projects the cracks in the areas with fabric were a series of unconnected scallops while in the areas without fabric the crack was a distinct, but not straight, crack. Using 1991 average bid prices of \$15.36 per ton for 3/4 inch Type A Binder and \$.67 per square yard for reinforced fabric it was determined that the cost of the fabric could pay for an additional 0.2 inch of asphaltic concrete.

CONCLUSIONS

On projects with more than 3 inches of new resurfacing or that have been previously widened, fabric is not necessary. On projects with less than 4 inches of new asphalt over newly widened pavements the fabric appears to reduce or delay the appearance of reflective cracks over the widening joint. It has little or no effect on other reflective cracks. Although deleting the fabric will not save enough money to sufficiently increase the thickness of the resurfacing to eliminate cracking,

other benefits of a thicker mat deserve consideration. Since the fabric has little effect on the transverse cracks the presence or absence of fabric is not evident to the casual observer. It does not appear that the areas without fabric will have a shorter service life than the reinforced areas.

Appendix A
1992 Survey Results

Project	Type	Recy.	Prev. Resur.	Milled	Widen Project	% Cracked Fab.	Non F.	Year Compl.	Thick. Inches	Length Miles	1988 AADT
FN-169-4(29)--21-25	Bind. Surf.	B A	N N	N	Y	12	70	87	3	12.944	2130
FN-6-2(26)--21-15*	Bind. Surf.	B A	Y Y	Y	N	0	0	87	3	6.259	2000
DP-17-3(25)--36-40	Bind. Surf.	B B	N N	N	Y	5	30	81	3	5.996	1350
FN-17-4(20)--21-99	Bind. Surf.	B A	Y N	Y	N	0	0	86	4.5	3.89	2680
FR-169-7(16)--2G-46	Bind. Surf.	B A	Y Y	Y	N	0	0	87	6	7.760	3700
FR-169-7(21)--2G-46	Bind. Surf.	B A	N N	N	Y	0	4	86	4.5	11.575	2200
FR-60-4(20)--2G-72 South	Bind. Surf.	B A	Y Y	Y	N	50	95	86	3	1.937	2180
FR-60-4(20)--2G-72 North	Bind. Surf.	B A	Y Y	Y	Y	45	95	86	3	5.203	2080
FN-6-7(31)--21-52	Bind. Surf.	B A	Y Y	Y	N	8	40	87	3	7.441	2700
FR-218-9(38)--2G-66	Bind. Surf.	B B	N N	N	Y	3	4	86	5.5	4.743	1400
FR-218-9(45)--2G-66*	Bind. Surf.	B B	N N	N	Y	0	1	86	5.5	7.08	1250
										74.828	

Y = Yes, N = No

* Projects showing a tendency to rut.

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Incorrect Project Information

FR-169-7(16)--2G-46	Should Be	FN-169-7(16)--21-46
FR-218-9(38)--2G-66	Should Be	FN-218-9(38)--21-66
FR-218-9(45)--2G-66	Should Be	FN-218-9(45)--21-66