

Skin Patching

pavement work tips — no. 45

May 2006

INTRODUCTION

Skin patching is used to waterproof or repair flexible pavement surface deficiencies of limited extent including:

- Any porous patches
- Minor surface crazing
- Small repairs with unbound and stabilised granular pavement materials.

The principles involved in skin patching are the same as those applicable to sealing and resealing; the main difference being in the scale of works.

Skin patching is often undertaken by maintenance crews using hand methods, simple equipment and cold binders such as bitumen emulsion or cutback bitumen. Use of hand spraying or squeegeeing of binders, and hand broadcasting of aggregate, requires experience and skill to achieve suitable application rates. This type of work is generally restricted to small nominal size aggregates (5, 7 or 10 mm).

Where practicable, the finished result should not be substantially different in colour and texture to the surrounding area. Texture depth is important where skin patching is being undertaken as a preliminary activity to a full reseal, as any variation in surface texture will result in a variation in binder application requirement and hence a variation in the finished surface texture and performance of the following sprayed seal.

MATERIALS

Binders

Binders used for skin patching are generally standard grades of bitumen emulsion (60% bitumen) or primersealing grades of cutback bitumen (AMC3 or AMC4).

Standard bitumen emulsions are stored and sprayed at ambient temperatures whereas primersealing grades of cutback bitumen require heating to temperatures of up to 135°C depending on the grade of binder.

A guide to temperatures for heating of cutback bitumen binders is provided in Table 1.

Heating must be undertaken in properly designed equipment with appropriate safety precautions (refer Austroads Bitumen Sealing Safety Guide).

Bitumen emulsions are classified as either anionic or cationic depending on the type of emulsifier used. Rapid setting grades are generally used for sprayed seal work although the slow setting cationic aggregate mixing grade, which typically contains around 8-10% of cutter oil, may sometimes be used in light traffic applications to improve aggregate adhesion.

Key Summary

This issue of 'pavement work tips' provides guidelines for the sprayed seal technique commonly referred to as skin patching for minor repair of road pavements.

Grade	Temperature range for spraying (°C)
AMC3	95–115
AMC4	110–135

Table 1 Heating of Cutback Bitumen Binders

Anionic Rapid Setting (ARS) emulsion is suitable for use only with dry aggregates and dry surface conditions. ARS emulsions break slowly in damp conditions and may be washed off the road surface if rain occurs before material is fully broken. Equipment used for storing and spraying anionic emulsions can generally be cleaned by flushing with clean water.

Cationic Rapid Setting (CRS) and Cationic Aggregate Mixing (CAM) emulsions may be applied in a wider range of conditions including damp surfaces. Cationic emulsions will leave a film of bitumen on the surfaces of containers and spraying equipment that can only be removed with a solvent such as kerosene.

Different types and grades of bitumen emulsion must never be mixed as premature breaking of the bitumen may occur. Emulsions must not be allowed to freeze or boil. Additional notes on storage and handling of bitumen emulsions are provided in Pavement Work Tip No.2.

continued on reverse



APPLICATION RATES

Binder Application Rates

Typical application rates for cutback bitumen and bitumen emulsion binders are shown in Table 2.

Aggregate Size (mm)	Binder Application Rate (L/m ²)	
	Cutback bitumen (primersealing grades)	Bitumen emulsion (60% bitumen)
7	1.0–1.2	1.4–1.6
10	1.2–1.4	1.6–1.8

Table 2 Typical binder application rates

Notes:

- 1 These rates are for total product i.e. including the cutter oil content of cutback bitumen or the water content of bitumen emulsions.
- 2 The rates are suitable for smooth sealed surfaces. For textured surfaces or unsealed surfaces, the rates should be increased by about 0.3 L/m².

Aggregate Spread Rates

Typical aggregate spread rates are shown in Table 3.

Aggregate Size (mm)	Aggregate Spread Rate (m ² /m ³)
5 or 7	120–140
10	100–120
5 or 7 (scatter coat)	400–600

Table 3 Aggregate spread rates

A scatter coat of 5 mm or 7 mm aggregate is sometimes used with 10 mm and larger aggregate seals as a second aggregate application to improve aggregate interlock and reduce seal damage during initial trafficking.

TECHNIQUES

The area to be skin patched should be marked out and masked, if necessary, to ensure a neat, regular shaped, finished area.

Hand spraying requires skill and practice to achieve uniformity and suitable rates of application. Hand spraying should be undertaken in smooth, parallel and overlapping strokes. The rate of application of binder should be sufficient to hold the aggregate in place without flushing of binder by subsequent trafficking. Operators should review completed work after a period of trafficking and, if necessary, adjust their application technique.

An alternative to hand spraying is squeegeeing. An appropriate amount of binder is poured in front of the squeegee and spread with smooth long strokes with minimal delay or going back over binder that has already been spread.

Aggregate should be carefully spread to completely cover the binder with a uniform layer of aggregate, one stone thick. Aggregate should be dropped rather than broadcast to avoid rolling or turning over during application. Turning over of aggregate particles that are partly coated with binder can result in binder on the surface and subsequent pick-up by traffic. Excessive application of aggregate should be avoided.

Traffic should not be allowed on emulsion sealed work until the emulsion is fully broken. Where practicable, initial trafficking should be restricted to low speeds (<40 kph) to provide time for establishing good adhesion between binder and aggregate, allow the binder to cure and develop sufficient strength to retain the aggregate. Signs warning of loose stones must remain in place until all loose aggregate is removed.

REFERENCES

Pavement Work Tip No. 1 – Priming and Primersealing

Pavement Work Tip No. 2 – Storage and handling of bitumen emulsions

Pavement Work Tip No. 43 – Selection and design of primerseals

Austrroads Guide to the Selection and use of Bitumen Emulsions (AP-G73/02)

Austrroads Sprayed Sealing Guide (AP-G76/04)

Austrroads Practitioners Guide to Design of Sprayed Seals – Revision 2000 Method (AP-T17/02)

Austrroads Bitumen Sealing Safety Guide (AP-G41/02)

For more information on any of the construction practices discussed in "pavement work tips", please contact either your local Austrroads representative or AAPA:

tel:
(03) 9853 3595;

fax:
(03) 9853 3484;

e-mail:
info@aapa.asn.au

A complete list of "pavement work tips" issues is available on AAPA's web site (www.aapa.asn.au) and all issues may be downloaded free with Acrobat Reader. Copies may also be obtained from AAPA.

Material may be freely reproduced providing the source is acknowledged.

This edition was prepared by Walter Holtrop and John Rebbechi in consultation with members of the Austrroads Bituminous Surfacing Research Reference Group.

Austrroads and AAPA believe this publication to be correct at the time of printing and do not accept responsibility for any consequences arising from the use of the information herein. Readers should rely on their own skill and judgement to apply information to particular issues.