

Sprayed Sealing of Drought- & Salt-Affected Pavements

pavement work tips - No 47

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INTRODUCTION

Availability of water for road construction is difficult in prolonged periods of dry weather and drought conditions. This particularly applies to rural areas where the primary sources of water are from streams and dams in competition with use for agriculture and domestic purposes.

As a consequence, pavements are therefore generally placed at just sufficient moisture content to achieve acceptable compaction. In addition, the water used is often from bores, or in some cases, in areas close to the coast, salt water has been used.

IN TIMES OF DROUGHT CONDITIONS

Priming or primersealing "DRY" Pavements

Because of the generally low moisture content, the pavement will absorb a larger than normal proportion of the primer or primerbinder and this must be taken into account in the selection and design process.

Priming

Consider using the next heavier grade than normal of cutback bitumen primer and/or increase the rate of application. For example, use AMC0 in place of AMC00, or use the normal primer but increase the rate by an additional 0.2 to 0.3 L/m². The heavier grade of primer should generally be the more effective option.

As an alternative, consider using a specialty bitumen emulsion primer, applied at the same rate as the cutback bitumen primer (based on TOTAL litres of cutback or emulsion measured at 15°C).

Primersealing

A similar approach applies to primersealing, except it may be sufficient to increase only the rate of application of primerbinder rather than having to use a heavier grade as well as increase the rate.

A bitumen emulsion primerbinder, particularly the CRS II (67% bitumen content) could be considered as an alternative.

Where possible, use a 7 mm aggregate to minimize the impact of any loss of primerbinder into the pavement, and it will also allow earlier application of the final seal if that is required.

Key Summary

This issue of "pavement work tips" provides guidelines for the sprayed seal initial treatments in times of drought conditions or on salt-affected pavements.

ON SALT-AFFECTED PAVEMENTS

Some pavement materials, particularly rubbles, may contain an appreciable quantity of salt. In addition, water used in preparation and compaction may also be saline.

Where one or both of these conditions is encountered, it is possible that eruptions of small blisters may occur, with the surface of the pavement immediately beneath the primer being in a loose condition with saline fines. The loose primer should be swept off prior to any attempts at fixing the problem.

As a broad guide, the preliminary treatment techniques should be adjusted depending on the salinity of the pavement expressed as salt content of the fines passing the 2 mm sieve.

Salt Content of Fines (%)	Preliminary Treatment Method
0-1.5	Treat as for a normal or drought-affected pavement.
1.5-2.5	Primerseal, followed as quickly as possible by the final seal.
2.5-3.0	A sacrificial prime plus primerseal, followed as quickly as possible by the final seal may be satisfactory. If in doubt, treat as for >3.0% salt content.
>3.0%	Special investigations will be required and suitable procedures developed.



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continued on reverse

The problem is likely to be more acute in areas with a high evaporation constant. If in doubt as to salt content, or the implications of a seal treatment over a suspect base, contact local road authority specialists for advice.

The aim is to apply treatment providing a heavy and robust seal treatment using relatively high binder rates for the conditions. It may also be necessary to apply the final seal earlier than otherwise recommended.

Prime: Bitumen emulsion primer, or heavy grade of cutback bitumen primer at 1.0-1.1 L/m². The emulsion primer can be covered in a shorter period than the cutback bitumen and is least likely to be affected by the salt.

Primerseal: AMC5, or CRS bitumen emulsion, with 7 mm aggregate (higher than normal rates of application).

Seal: Double/double seal, 14/7 mm combination preferred to provide robust and waterproof seal. Use either C170 binder, or appropriate PMB S10E, S35E, S45R. Design in accordance with Austroads - Update of Sprayed Seal Design Method (AP - T68/06).

The following construction procedures are recommended:

- (a) Do NOT slurry the pavement surface.
- (b) Prime or primerseal should be applied as soon as possible after completion of the base course.
- (c) Immediately after construction open the primerseal to construction and/or controlled traffic.
- (d) Apply the double/double final seal as soon as practicable.
- (e) Ensure the full width of the seal is rolled/trafficked.

Repair of salt damaged areas

Where conventional methods have been used, and the surfacing is damaged by salt, repairs can generally be successfully achieved by the following action if the surface has not been damaged to the extent it is too rough or unfit for sealing.

Prime or Primerseal

- Broom off all loose material, including any visible salt from base.
- Reprime with bitumen emulsion OR heavy grade of cutback bitumen primer OR primerseal with AMC5 or CRS bitumen emulsion.
- Apply double/double seal as soon as possible.

Seal

- For light damage - flatten blisters by rolling, and reseal if necessary.
- For heavy damage - remove surfacing and any visible salt. Box out pot-holes and the worst sections to the full depth of powdering, and tack coat. Repair using aggregate and bitumen emulsion. Reseal full width using double/double seal with either C170 or PMB as outlined above.

REFERENCES

- Pavement Work Tips No. 1 - Priming and Primersealing
Pavement Work Tips No. 43 - Selection and Design of Primerseals
Austroads Sprayed Sealing Guide (AP-G76/04)
Austroads - Update of the Sprayed Seal Design Method (AP-T68/06).

For more information on any of the construction practices discussed in "pavement work tips", please contact either your local AUSTROADS 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 website: www.aapa.asn.au

Issues may be downloaded using Adobe Acrobat Reader. Copies may also be obtained from AAPA.

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