

Treatment of Flushed or Bleeding Surfaces

pavement work tips - No 7

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INTRODUCTION

A flushed or bleeding surface is one where there is reduced texture depth as a result of excess of bitumen on or near the surface of a sprayed seal or asphalt surfacing.

Reduced surface texture can lead to reduced wet weather skid resistance. In sprayed seals, the presence of surface bitumen can also increase the difficulty in satisfactorily placing subsequent surfacing treatments and, in extreme cases, may also result in pick-up of binder on vehicle tyres.

Sprayed Seals

In general terms, the most common causes of flushing or bleeding in sprayed seals are:

- an excessive application of binder for the particular service conditions,
- embedment of aggregate into underlying granular pavement (initial seals) or into the binder of the previous treatment (reseals),
- softening and bleeding of binder in hot weather due to the amount of cutter oil in the binder,
- overturning of aggregate by heavy turning traffic, and
- high pavement temperatures (often associated with high traffic volumes and/or heavy vehicles).

A similar condition to that of flushing is a stripped seal resulting in exposure of binder without aggregate covering.

Generally, flushing is confined to wheelpath areas. It may extend across the full width of the pavement, or occur in defined areas as a result of bleeding or embedment into patching, crack sealing or other local surface variation prior to placing the sprayed seal.

Asphalt surfaces

Flushing in asphalt surfaces is usually an outcome of densification of the asphalt under heavy traffic and may also be accompanied by rutting and shape loss.

TREATMENT TYPES

Treatments for flushed or bleeding surfaces fall into three major groups:

- application of additional aggregate to compensate for excess binder,
- removal of excess binder, or
- resurfacing.

On occasions, immediate action may be necessary for road safety reasons or to prevent further surfacing deterioration or pick-up of binder, for example, bleeding or flushing of a sprayed seal after an extended period of hot weather.

Short term treatments that can be effective include:

- gritting the flushed area with clean (sometimes pre-coated) size 5 mm or, preferably, 7 mm aggregate. Very fine materials or crusher dust should be avoided as they can combine with the excess binder to create a tacky material that can lead to further pick-up in hot weather and make it more difficult to apply subsequent remedial treatments;
- temporarily cooling the pavement by the application of water.

Application of Additional Aggregate

In its simplest form, additional small sized aggregate can be applied directly to a flushed or bleeding sprayed seal. Additional aggregate is generally most effective when applied to fresh, lively binders and in warm dry conditions.

Key Summary

This issue of "pavement work tips" provides some practical remedial treatments for restoring texture to flushed or bleeding surfaces.



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Effectiveness of aggregate adhesion may be improved with the use of heated aggregate or application of a chemical solvent to soften the binder.

Procedures for the use of chemical solvents to soften the binder is described in Pavement Work Tip No 48.

Removal of Excess Binder

The most effective means of removing excess binder is high pressure water retexturing as described in Pavement Work Tip No 44.

Removal of binder should not be applied to primerseals and initial treatments where it may result in insufficient binder to hold the aggregate in place.

Resurfacing

The resurfacing of flushed surfaces using sprayed seals requires allowance, or use of specific techniques, to compensate for the flushed binder condition.

Generally, sprayed seals are most readily suited to resurfacing of seals with aged and hardened binders where there is less risk of further aggregate embedment and bleeding.

The choice of binder, e.g. bitumen emulsion or polymer modified binder, may assist in reducing the risks associated with bleeding and embedment. A specific technique to compensate for surface texture variation using pre-spraying, is described in Pavement Work Tip No 36.

Other specific sprayed sealing techniques for treatment of flushed surfaces include dry matting, 'sandwich seal' or 'inverted seal' as described below. (See also Pavement Work Tip No 32).

In some circumstances a sprayed seal may not be practicable, particularly where sprayed seal surfaces are extensively damaged by heavy turning traffic, and the only suitable alternative is resurfacing with asphalt or slurry surfacing.

Where flushing in asphalt surfaces is accompanied by rutting and shape loss, milling and removal of unstable asphalt materials may be required before resurfacing.

Dry matting

Dry matting, or sandwich seal, is a technique involving the use of two applications of aggregate

'sandwiched' around a single application of binder. It can be used as a corrective treatment on stripped, or partially stripped, seals or flushed bituminous surfaces. It involves spreading a layer of aggregate over the flushed surface followed by a single application of binder and a further application of aggregate, generally a smaller size, to lock the first layer of aggregate in place. In the case of partially stripped seals, the first layer of aggregate is used to infill the areas of lost aggregate only.

Inverted seal

An inverted seal involves two applications of binder and aggregate using a small sized aggregate (commonly 7 mm) in the first application and a larger sized aggregate in the second. This treatment is used to reduce the risk of embedment of the larger aggregate into a flushed surface.

TREATMENT SELECTION

The selection of treatment for flushed surfaces must take into account a range of factors including the age and condition of the surfacing, the causes of flushing, condition of the binder, climatic conditions and potential impact on future performance.

In general terms, techniques involving additional aggregate, including solvent treatments, tend to be more successful in warm conditions on sprayed seal surfaces that are less than about two years old.

High pressure water retexturing tends to be more appropriate to slightly hardened binders, subject also to the constraints referred to above.

Resurfacing options, ranging from a simple sprayed seal to total removal and replacement of the surfacing, involve a large number of issues that have already been outlined above.

REFERENCES

- Pavement Work Tip No 32, Sprayed seals – a brief description.
- Pavement Work Tip No 36, Pre-spraying to correct surface texture.
- Pavement Work Tip No 44, High pressure water retexturing.
- Pavement Work Tip No 48, Treatment of flushed seals using chemical solvents.

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.

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