

SELECTION OF A TREATMENT FOR FLUSHED SPRAYED SEALS

INTRODUCTION

Various treatments for correction of flushed seals are described in a range of VicRoads Technical Notes and other publications. The purpose of this Technical Note is to provide a guide to the selection of the particular treatment for specific circumstances and sources of information on treatment techniques by guiding readers to the appropriate Technical Note.

CAUSES OF FLUSHING IN SPRAYED SEALS

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

Reduced surface texture can lead to a decrease in service life and wet weather skid resistance. In addition, 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.

A general guide to causes and avoidance measures for flushing in sprayed seal surfacings is provided in Technical Note (TN) 47.

In general terms the most common causes 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).

In addition, a stripped seal may result in exposure of binder without aggregate cover causing similar problems to a flushed seal. Further advice on preventing and treating of stripped seals is provided in VicRoads TN 87.

Commonly, flushing is confined to wheelpaths areas but 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.

TREATMENT TYPES

Alternative treatments for flushed seals comprise three basic categories:

i) Application of Additional Aggregate

In its simplest form, additional aggregate can be applied directly in the form of grit or small sized aggregate. Additional aggregate is generally most effective on fresh, lively binders and in warm dry conditions. Effectiveness may be improved with the use of heated aggregate or application of a chemical solvent to soften the binder using the techniques described in TN 18.

ii) Removal of Excess Binder

The most effective means of removing excess binder is High Pressure Water Retexturing (HPWR) as described in TN 62. TN 19 describes a similar technique using a small hand guided. Removal of binder should not be applied to primerseals and initial treatments without seeking specialist advice as it may result in insufficient binder to hold the aggregate in place and/or reduce the waterproofing of the pavement.

iii) Resurfacing

Resurfacing 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 when the binder is aged and hardened and 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 TN 23.

In some circumstances the application of a new sprayed seal may not be practicable and the only suitable alternative is resurfacing with asphalt or slurry surfacing.

TREATMENT SELECTION

The selection of treatment for flushed seals 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. Table 1 provides a guide to the most common conditions and preferred treatments. Further guidance on specific application of selected treatments may be obtained in the referenced documents and in some cases specialist advice should be sought.

Table 1 Selection of Treatment for Flushed Sprayed Seals

Surfacing	Condition	Climate	Preferred treatment options	Reference
New primerseal/ initial treatment (≤ 2 yrs)	Embedment/flushed/ bleeding	Hot/dry	1. Additional aggregate	TN 18
		Cool/ damp	1. Additional aggregate (chemical solvent)	TN 18
	Damage by turning traffic	All	1. Repair / patch prior to application of final seal 2. Resurface using asphalt in severe cases	
	Stripping	Hot/dry	1. Additional aggregate 2. Resurface	TN 18 TN 47
		Cool/damp	1. Additional aggregate 2. Resurface	TN 18 TN 47
	New reseal (≤ 2 yrs)	Embedment/flushed/ bleeding	Hot/dry	1. Additional aggregate
Cool/ damp			1. Additional aggregate (chemical solvent) 2. Binder removal	TN 18 TN 62
Damage by turning traffic		All	1. Additional smaller aggregate 2. Resurface using asphalt in extreme cases	TN 18
Stripping		Hot/dry	1. Additional aggregate 2. Resurface	TN 18 TN 47
		Cool/damp	1. Additional aggregate 2. Resurface	TN 18 TN 47
Mature seals (2–5 yrs)		Embedment/flushed/ bleeding	Hot/dry	1. Additional aggregate (chemical solvent) 2. Binder removal
	Cool damp		1. Binder removal 2. Resurface	TN 62 TN 23, TN 47
	Stripping	All	1. Resurface	TN 47
Aged seals (> 5 yrs)	Embedment/flushed/ bleeding	Hot/dry	1. Binder removal 2. Resurface	TN 62 TN 23, TN 47
		Cool/damp	1. Binder removal 2. Resurface	TN 62 TN 23, TN 47
	Stripping	All	1. Resurface	TN 47

REFERENCES

VicRoads (2006) Technical Note 18 – *Treatment of flushed seals using chemical solvents.*
 VicRoads (1997) Technical Note 19 – *Treatment of flushed surfaces using high pressure water.*
 VicRoads (2006) Technical Note 23 – *Pre-spraying of sprayed seal surfaces.*
 VicRoads (2001) Technical Note 47 – *Flushed bitumen surfaces.*
 VicRoads (2002) Technical Note 62 – *High pressure water retexturing.*
 VicRoads (2007) Technical Note 87 – *Bituminous surfacing – Stripped seals.*

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