

Technical Direction

Pavements

PTD 2019/001 | RMS 19.1436 – 01 November 2019

Treatments for bleeding seals

| Summary: | Audience: |
|---|---|
| The purpose of this Technical Direction is to provide guidelines on how to treat bleeding sprayed seals that are not attributed by pavement structural defects. | <ul style="list-style-type: none"> • District Works Managers • Asset Managers • Maintenance Planners • Councils |

Introduction

Sprayed seal is the predominant and most cost effective pavement surfacing type in New South Wales covering over 70% of the road network. Sprayed sealing offers a number of benefits including waterproofing pavement layers, increasing skid resistance, retarding cracking and minimising rate of pavement deterioration. However, inadequate selection and design of sprayed seals, inadequate site preparation and poor construction practices can cause a number of surface defects including bleeding.

Bleeding can reduce skid resistance and can cause long term distress to the seal particularly on a hot day.

This Technical Direction provides guidance on the selection of appropriate treatments for bleeding sprayed seal surfaces.

Definition of bleeding seal

‘Bleeding’ is a surface defect in which excess binder completely covers the aggregate (see Figure 1). It occurs when excess binder fills the voids in the aggregate mat and moves to the pavement surface due to a combination of repeated wheel loading, with heat expansion in a non-reversible cumulative process.

Approvals:

| | | | |
|-----------------------|--|------------------------|---------------|
| Owner: | Sam Henwood Director Pavements & Geotechnical | Review Date: | November 2022 |
| Authorised by: | Chris Harrison Director of Engineering | Effective Date: | November 2019 |



Figure 1: View of a bleeding sprayed seal

Factors that contribute to bleeding seals

Factors that contribute to bleeding seals include issues pertaining to:

- Aggregates (e.g. aggregate spread rate, use of soft aggregate and use of misshapen aggregates).
- Binder (type, application rate and quality).
- Traffic (traffic volume, axle configuration and load, traffic movements and intersections).
- Environmental (e.g. high pavement temperature and humidity).
- Construction (e.g. poor construction practices, improper assessment of the existing pavement conditions and poor pavement preparation techniques prior to sealing).

Treatment types for bleeding seals

Treatments for bleeding seals fall into three major groups:

- Pretreatments (e.g. use of bitumen hardener, precoated aggregate and high pressure waterblasting).
- Treatment during sealing (e.g. packing coat and use of low residual binder application rate with high cutter oil content).
- Application of alternative surfacing (e.g. asphalt).

Descriptions of treatments for bleeding seals are listed in Table 1 (Roads and Traffic Authority, 2002).

Table 1: Treatments for bleeding seals

| Code | Treatment type | Description |
|------|---|---|
| A | Bitumen hardener with precoated aggregate | Bitumen hardener is sprayed at 0.45 to 0.50 L/m ² to temporarily soften the existing bituminous seal. After the binder softens (generally takes 10 to 20 minutes but longer for polymer modified binders) spread and roll precoated aggregate into the softened binder using a multi-tyred roller. |
| B | Precoated aggregate | Spread and roll clean precoated aggregate into a softened binder using a multi-tyred roller when the pavement temperature is greater than 45°C. |
| C | Hot aggregate ¹ | Spread and roll clean unprecoated hot aggregate (aggregate which has been heated up to 200°C in an asphalt plant) into a softened binder using a multi-tyred roller when the pavement temperature is greater than 35°C. |
| D | Low residual binder application rate and high cutter oil content ¹ | Spray residual binder application rate of 0.4 to 0.5 L/m ² with 10 to 20% cutter oil when the pavement temperature is greater than 35°C. Spread 7 mm or 10 mm nominal size aggregate at 130 to 180 m ² /m ³ and roll by multi-tyred roller. |
| E | Precoated with cutter oil ¹ | Spread and roll clean aggregate freshly precoated with cutter oil into a softened binder using a multi-tyred roller when the pavement temperature is greater than 45°C. |
| F | High pressure waterblasting ² | The high pressure waterblasting machine combines watercutting and road cleaning technologies in a single process to simultaneously remove excess binder and contaminants from the pavement surfaces and retexture aggregate surfaces improving road surface macrotexture. |
| G | Packing coat ³ | Spread clean precoated aggregate onto the smooth surface at a rate of 100 to 200 m ² /m ³ (Roads and Maritime, 2013) immediately prior to sealing. Aggregate size must be half or same nominal size as the sealing aggregate size. |

Notes:

1. Seek specialist advice prior to application.
2. This process does not work when the seal is hot.
3. In addition to a new seal.

Selection of treatment

Selection of the treatment must take into account the age of the pavement, the age of the seal, the severity of the bleeding problems, the condition of the surface and binder, the causes of bleeding, the climatic condition, the cost and the potential impact on the short and long term performance of the existing seal.

Correctly identifying the defect and cause will lead to one or more possible options. The method chosen may often depend on the available methods in the region at the time the treatment works are to be applied.

As a guide, Figure 2 illustrates the cost versus the effectiveness on restore texture of the surface of each treatment identified in Table 1.

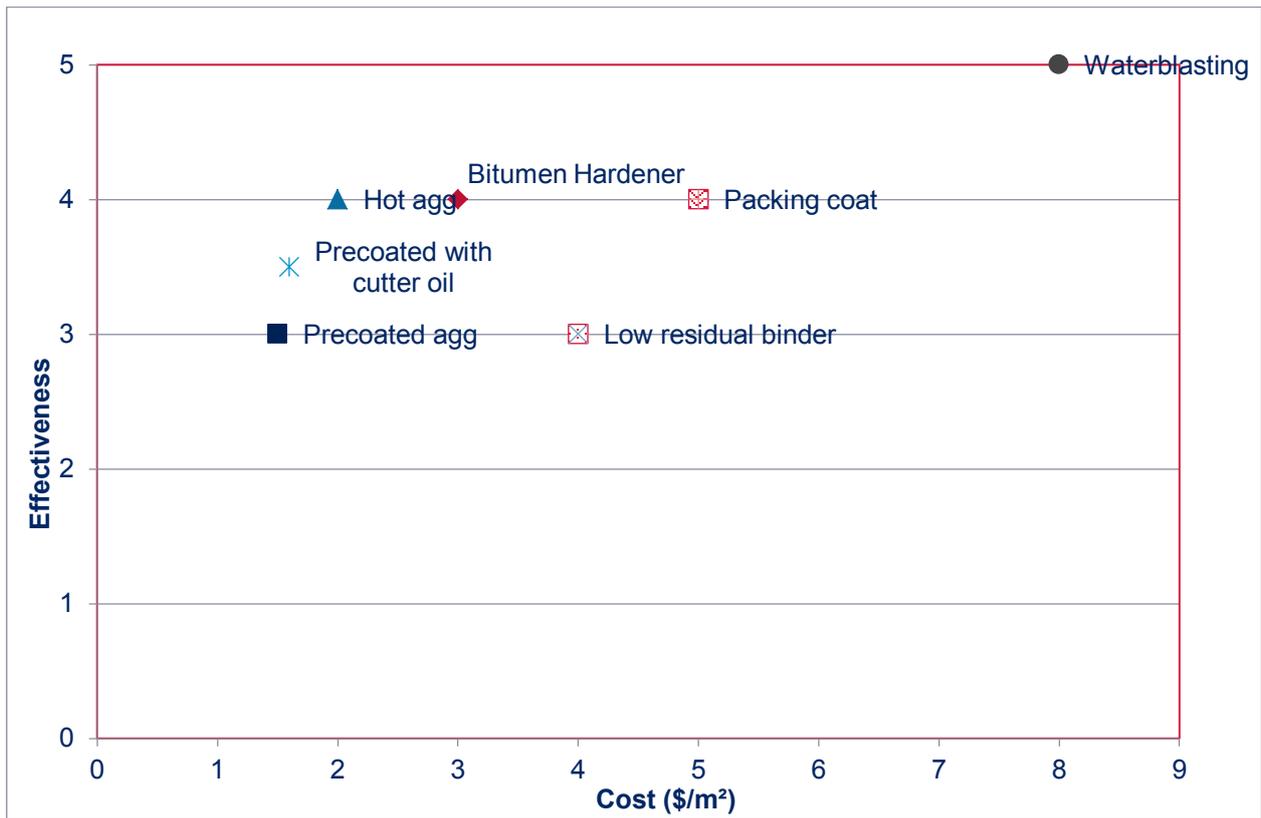


Figure 2: Effectiveness on restore texture of the surface and cost of treatments types
 (Note: Refer to Table 1 for the full description of the treatment)

References:

Roads and Traffic Authority (2002) Sprayed Sealing Guide, Section 7 - Remedial treatments and pretreatments, Sydney NSW.

Roads and Maritime (2013) RMS Technical Direction - Packing coat treatment for sprayed seals, PTD 2013/003, North Sydney NSW.



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