pavement work tips

Sprayed Seal Cutting Practice

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INTRODUCTION

Austroads Technical Report AP-T39/05 provides a draft Guide to Sprayed Sealing Cutting Practice.

This 'work tip' provides both a summary and an update of the Guide.

Particular features introduced by the Guide are:

- ***The adoption of pavement temperature in preference to air temperature.***

  As pavement temperatures under fine conditions are often higher than air temperatures, the proportions of cutter oil are somewhat less than charts based on air temperature.

  Determination of pavement temperature requires suitable measuring equipment. Thermocouple-based electronic thermometers are cheapest but hand-held infra-red thermometers can be the most convenient.

  Shaded areas of pavement require careful evaluation. Generally, the amount of cutter oil will be based on the coolest pavement areas but proportion and duration of shade must also be considered.

- ***Recommendation of lowest practicable proportions of cutter oil consistent with good practice.***

  Cutter oil is used in sealing binders to promote initial wetting and enable effective adhesion of aggregates, as well as assisting embedment and aggregate reorientation in the early life of the seal.

  The quantity of cutter oil required is greater in cooler conditions, lighter traffic and smaller aggregates. Excessive amounts, however, should be avoided as cutter oil can remain in the seal for many months and cause problems such as bleeding in the next spell of hot weather.

The two aims of the draft Guide, therefore, are to minimise cutter oil proportions as well as to avoid sealing work in conditions that require high proportions of cutter oil.

Key Summary

This issue of "pavement work tips" provides a handy reference to the recommended practice for cutting sprayed sealing binders.

BASIC CUTTING PRACTICE FOR CLASS 170 BITUMEN

Tables A and B provide the parts by volume of cutter oil to be added to 100 parts by volume of bitumen measured at 15°C.

A. Aggregates of 10 mm Nominal Size or larger

Pavement Temperature (°C)	Traffic (veh/lane/day)*		
	<100	100–1500	>1500
20–25	8	6	4
26–32	6	4	2
33–38	4	2	0
39–45	2	0	0
>45	0	0	0

B. Aggregates of 7 mm Nominal Size or smaller

Pavement Temperature (°C)	Traffic (veh/lane/day)*		
	<100	100–1500	>1500
20–25	10	8	6
26–32	8	6	4
33–38	6	4	2
39–45	4	2	0
>45	2	0	0

* Traffic volumes based on AADT. Separate rates may apply to various lanes of multi-lane facilities.

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ADJUSTING BASIC CUTTER RATES

The basic rates of cutter oil volume are based on assumptions of fine, stable weather conditions, and active, freshly applied or partially dried, oil or bitumen-based precoating materials.

Adjustments to the basic rates should be made for the following conditions.

Prevailing and Impending Weather Conditions

Add:

- Up to 2 parts during periods when temperatures are falling (e.g. late afternoon) or when cooler days are expected to follow.
- Up to 4 parts if very cold overnight temperatures (e.g. less than 5°C) are expected to follow.
- 2 parts of cutter oil for each 5°C interval decrease in pavement temperature below 20°C when sealing in such cooler conditions is necessary. Note, however, that hot spray sealing should not be performed at pavement temperatures below 10°C.

  Cooler conditions also require shorter sprayer runs, rapid aggregate cover and additional rolling.

Wind Chill Factor

Subtract 5°C from measured pavement temperature when there is a fresh breeze and air temperatures are below 30°C and adjust cutter oil rates accordingly.

Do not continue sprayed sealing operations if the adjustment for wind chill reduces the effective pavement temperature to below the recommended minimum.

Do not continue sprayed sealing operations in strong winds, regardless of temperature.

Condition of Aggregates and precoat

Add 2 parts where the condition of aggregate precoat is dry or inactive.

Add a further 2 parts if precoated stockpiled aggregates are damp.

Do not make adjustments for precoat condition or aggregate moisture where:

- Traffic >1500 veh/lane/day and pavement temperature >38°C, or
- Traffic 100–1500 veh/lane/day and pavement temperature >45°C.

Fluxed Bitumen

Reduce cutter oil by quantity of flux oil added.

Adhesion Agents

Do not alter proportion of cutter oil by presence or otherwise of adhesion agents.

Reality Check

All the above adjustments to basic cutting practice are cumulative. If adjustments add 6 parts or more to the basic rate, then a review should be undertaken as to whether conditions are suitable to continue sprayed sealing operations.

A field check can also be made by lifting an aggregate particle from the binder about one minute after spreading or dropping gently into freshly sprayed binder. The aggregate should retain a coating of binder with a short tail forming as it is removed from the pavement. Little or no adhering binder can indicate inadequate cutter, whereas a runny binder, that may even drip off the stone, indicates an excessive amount (see photos below).

MULTIGRADE BITUMEN AND CLASS 320 BITUMEN

A further 2 parts of cutter oil should be added to the proportions of cutter oil required for Class 170 bitumen when using multigrade bitumen Class M500/170.

Up to 2 parts of additional cutter oil should also be used when Class 320 bitumen is used for sprayed sealing work.

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

This edition was prepared by members of the Bituminous Surfacings Research Reference Group.

POLYMER MODIFIED BINDERS (PMBS)

PMBs require special consideration. Reference should be made to Work Tip No 27 or manufacturer's recommendations.

REFERENCES

Pavement Work Tip No 27, Sprayed Sealing – Cutting Back of Polymer Modified Binders.

Austroads - Sprayed Seal Cutting Practice, Austroads Technical Report AP-T39/05.

Photos courtesy of VicRoads

Not enough cutter oil

Too much cutter oil

Correct amount