

Sprayed seals - spreader calibration and aggregate application rates

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INTRODUCTION

Accurate and uniform rates of application of aggregate are important to the performance of sprayed seals and involve:

- Selection of an appropriate design rate
- Calibration of aggregate spreading equipment for uniformity and consistency of output
- Well maintained equipment
- Suitably trained and skilled operators
- Field monitoring of the uniformity and rates of spread.

DESIGN SPREAD RATE FOR AGGREGATE

The determination of aggregate spread rates is part of the design procedure contained in the Austroads *Provisional Sprayed Seal Design Method, Revision 2000* (AP-T09) and/or individual state road authority specifications.

The review of sprayed seal design practice and field performance that was undertaken in development of the new provisional sprayed seal design method found that aggregates were often spread at heavier rates than that necessary for good performance. Users may find that application rates in the new design guide may be lighter than those in some previous design guides and past practices.

Spread rates slightly heavier than the basic design rates may be required when using modified binders and bitumen emulsions.

On roads with low traffic volumes (<200 v/1/d) the quantity of aggregate spread may need to be increased by up to 10% to provide a tighter aggregate mat and compensate for the reduced amount of traffic reorientation of aggregate.

Overspreading of aggregate is wasteful in terms of the quantity of aggregate used, increases the risk to the travelling public arising from loose stones on new work, and increases the cost of removal and cleaning up of surplus aggregate from completed jobs.

Overspreading is often a result of compensation for a lack of uniformity. Operation of equipment to achieve uniform rates of application of aggregate is therefore an important element in achieving minimum spread rates and avoiding wastage.

CALIBRATION OF AGGREGATE SPREADERS

An Austroads Test Method for Field Calibration of Aggregate Spreaders is in the course of preparation. Essential elements are as follows.

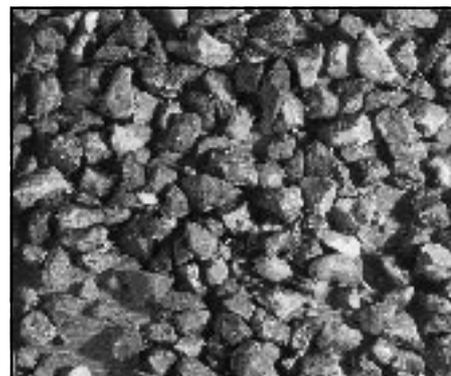
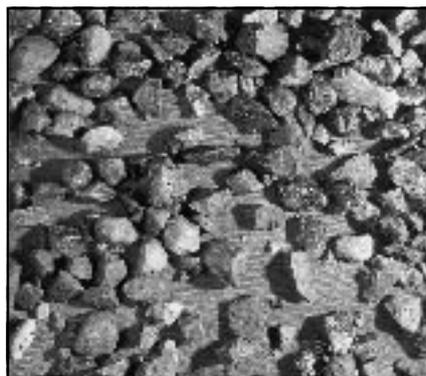
Spreaders should be calibrated with aggregate from the stockpile to be used for the work and the setting maintained for the duration of the job. Calibration is best done off-road.

A calibration site needs to be of sufficient length to allow the aggregate spreading unit to reach normal operational speed before applying the aggregate. Calibration can be done with standard calibration mats or by painting 1m² areas on the test site. The total width of the aggregate spreader must be calibrated.

Key Summary

This issue of 'pavement work tips' provides a guide to spreader calibration and aggregate application for sprayed seals.

These photographs show a spread rate that is too light (left), and one that is acceptable (right), for a conventional binder seal



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MONITORING OF AGGREGATE SPREADING IN THE FIELD

Aggregate application rates should be monitored for uniformity and total quantity of aggregate applied.

Transverse and longitudinal variation may be seen as long strips or small cells where the aggregate is either deficient or over applied.

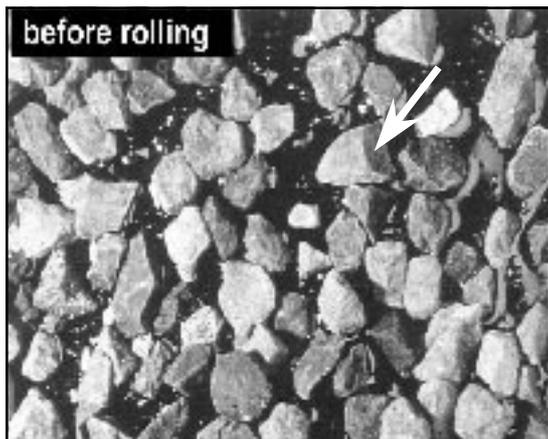
Variation can be minimised by maintaining spreading units in good working order and operating at a constant speed throughout the spreading run. Defective spreading equipment should be repaired immediately or removed from the job until the repairs are completed.

Monitoring of the quantity of aggregate used can be checked by weighing or careful levelling of all delivery trucks. Any wastage should be recorded to enable accurate calculation of average aggregate spread rates.

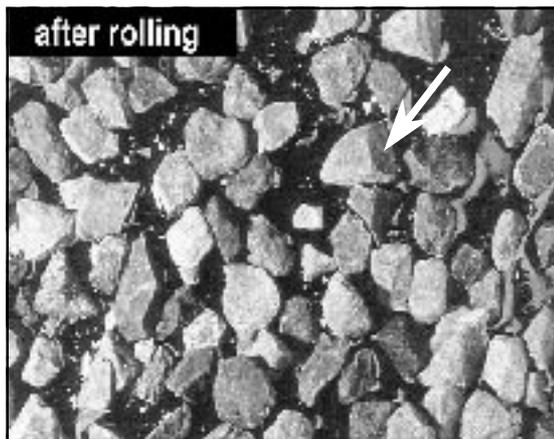
AGGREGATE REORIENTATION AND EMBEDMENT

Reorientation and embedment are achieved by rolling and traffic. A drag broom used in conjunction with rolling can assist in improving uniformity of aggregate coverage by moving surplus stones into small windows and gaps.

The following elapsed time frame pictures (from a conventional binder seal) demonstrate how aggregate particles move around under traffic and seat into gaps, until a tight aggregate mosaic is formed. All four photographs were taken on the same location and the white arrow is used to show a common particle.



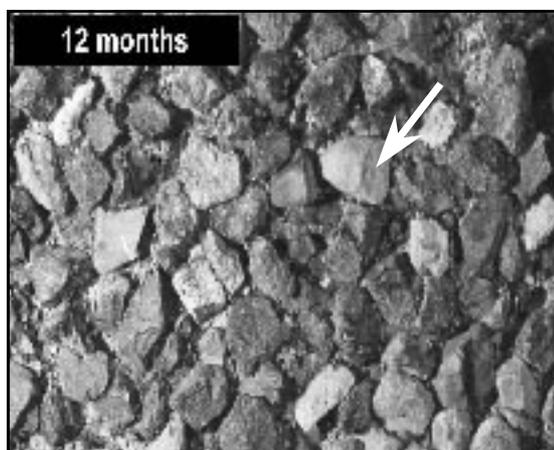
New seal – aggregate spread at the design application rate



Rolling seats aggregate into binder



Traffic begins to move particles around



Aggregate formed into tight mosaic after 12 months of traffic

For more information on any of the construction practices discussed in "pavement work tips", please contact either your local AUSTRROADS Pavement Reference Group 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 web site: www.aapa.asn.au Issues may be downloaded using Adobe Acrobat Reader. Copies may also be obtained from AAPA.

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This edition was prepared by David Bligh and John Rebbechi in consultation with members of the National Bituminous Surfacing Research Group.

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