



# Geotextile Reinforced Sprayed Seals

pavement work tips — no. 25

April 2001

## INTRODUCTION

Geotextiles may be used as reinforcement in sprayed seals to improve performance as a waterproofing membrane in sprayed seal and asphalt interlayer applications.

The use of a geotextile combined with high binder application rates provides a tough bituminous membrane with very high resistance to reflective cracking. Geotextile reinforced seals can also be combined with polymer modified binders (PMBs) for even higher levels of performance.

## APPLICATIONS

The primary uses of geotextile reinforced seals are:

- As an alternative to PMB binder used as a strain alleviating membrane (SAM) sprayed seal to waterproof aged or cracked bituminous surfaces. This can involve a single/single seal with a large aggregate (14 mm) and PMB binder, or a double/double seal that uses Class 170 bitumen binder in both applications or a PMB binder in the first application only. Generally, double/double seals are more effective as it can be difficult to obtain initial retention of aggregate in single/single seals.
- As an alternative to PMB binder used as a strain alleviating membrane interlayer (SAMI) prior to placing asphalt over cracked pavements. In this application, Class 170 bitumen with a single application of 10 mm aggregate is most commonly used.
- Surface treatment on road pavements constructed of low quality base materials. This has been found to be effective in remote areas where high quality roadbase materials are unavailable. By controlling moisture, using a combination of pavement drainage and the waterproofing effectiveness of a reinforced seal, clay soils and other low quality materials may provide adequate load carrying capacity.

- As an alternative to, or in combination with, PMB binder in SAM or SAMI applications where there is a risk of cracking developed from cemented base materials.

### Key Summary

*This issue of 'pavement work tips' provides a guide to the use of geotextile reinforced sprayed seals.*

## GEOTEXTILES

Geotextiles used in sprayed sealing work are generally non-woven, needle punched and manufactured from polyester or polypropylene. Polyester geotextiles are generally preferred for hot bitumen work due to their higher melting point. Polypropylene geotextiles should not be used where binder temperatures are likely to exceed 165°C.

Important characteristics for sprayed work are the volume of binder retained and the strength of the geotextile. Strength is determined in accordance with AS 3706 – Geotextiles – Method of test.

Two grades, providing different levels of bitumen retention are generally used:

- 130–140 g/m<sup>2</sup> for most resealing applications
- 175–200 g/m<sup>2</sup> where a thicker membrane is required, for example initial seals on low quality base materials.

## DESIGN

Binder application rates for geotextile reinforced seals are determined in accordance with standard procedures with an additional allowance for binder retained by the fabric.

Typical allowances for binder retained by geotextile are shown in Table 1.

Table 1. Typical Geotextile Retention Allowances

Geotextile Grade	Retention Allowance (L/m <sup>2</sup> )
130 – 140g/m <sup>2</sup>	0.9 to 1.0
175 – 200g/m <sup>2</sup>	1.1 to 1.3

*continued on reverse*

## CONSTRUCTION

### Equipment

The only additional equipment required is a frame to facilitate the application of the geotextile. This may be attached to a loader, tractor, or roller and is designed to ensure that the geotextile is placed evenly without creases or wrinkles.

### Techniques

An initial tack coat or bond coat is sprayed prior to spreading fabric. This is usually unmodified Class 170 bitumen with little or no cutter oil.

The rate of application is generally based on the surface texture allowance plus around half of the geotextile retention allowance. Typical tack coat application rates are around 0.4–0.8 L/m<sup>2</sup> but will vary with surface texture, weather conditions and amount of cutter oil. Field adjustments are generally made to ensure that the highest practicable amount is applied without pick-up by multi tyre rolling.

The geotextile **must be applied promptly after spraying** of tack coat to ensure adhesion and to avoid potential slippage. Short sections are used to ensure rapid coverage. The geotextile is then rolled with a multi tyre roller to obtain embedment into the tack coat. Traffic and other construction vehicles are generally kept off the geotextile before spraying the remainder of the design binder (including the balance of the retention allowance) and spreading of aggregate.

### Factors Influencing Performance

Some of the particular factors influencing the success of geotextile reinforced seals include:

**Surface texture.** Highly variable surface texture can make it difficult to design a suitable binder application rate. In such cases some form of corrective treatment using sprayed seal or asphalt may be used to improve uniformity, or coarser textured areas pre-sprayed to provide a higher effective binder application rate.

Very coarse texture (more than about 1.5 mm texture depth) may result in the geotextile being suspended across the surface of the

aggregates creating a void that can contain air or water. Some instances of stripping of geotextile seals have been attributed to this factor. Similarly, large cracks and other discontinuities can result in voids under the geotextile. Generally, a 7mm sprayed seal is an appropriate corrective treatment to provide a fine uniform surface texture for the following geotextile reinforced seal.

When undertaking major repairs prior to geotextile reinforced seals, consideration must be given to potential impact of patching work on variations in surface texture or effect of materials such as cold mix and crack filling materials on subsequent embedment or flushing of the sprayed seal.

**Weather.** Geotextile reinforced seals tend to be more susceptible to damage by rain, etc. immediately after construction. High cutter oil content, associated with spraying in cool conditions, can lead to flushing and bleeding in subsequent hot weather. Generally, geotextile reinforced sealing work should be programmed to be only undertaken during favourable weather.

**Slippage** of the geotextile reinforced sprayed seal has occurred at locations:

- Of high longitudinal forces, such as those due to vehicles braking at intersections; or,
- Of high transverse forces due to tight radius curves or turning movements;
- On smooth sealed surface at high stress sites.

Consideration may need to be given to the application of a 7mm correction seal as a friction key for smooth surfaces in heavy duty applications.

**Edge Effects.** Trafficking of outside edges can cause the geotextile to be lifted or be shoved sideways. Treatments should extend sufficiently onto the shoulders to minimise the shearing effect of traffic.

**Joints.** Generally an overlap of 150 to 200mm is required to provide an adequate joint. Joints must be adequately bonded. Additional binder must be applied to overlaps to compensate for additional binder retention and to avoid aggregate stripping.

For more information on any of the construction practices discussed in "pavement work tips", please contact your local APRG representative or AAPA –  
tel (03) 9853 3595;  
fax (03) 9853 3484;  
e-mail:  
info@aapa.asn.au  
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This edition was prepared by Kym Neaylon and John Rebbechi in consultation with members of the National Bituminous Surfacing Research Group.

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## REFERENCES

1. RTA Maintenance of Geotextile Reinforced Seals on Clay Pavements 1998
2. Transport SA Report on trials of Geofabrics incorporated in sprayed seals, Rose SJ, 1991
3. VicRoads Technical Bulletin No. 38 – Guide to Geotextile Reinforced Sprayed Seal Surfacing, 2000