pavement work tips

AUSTROADS PAVEMENT REFERENCE GROUP

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Cape Seals

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INTRODUCTION

The Cape Seal was developed as a tough, flexible and durable surfacing with excellent resistance to surface scuffing and shearing forces. It takes its name from its origin in the Cape Region of South Africa.

The concept involves a sprayed seal using a large nominal size (20 mm) aggregate followed by a slurry surfacing to fill the voids in the sprayed seal aggregate, thereby locking it into place (Figure 1).

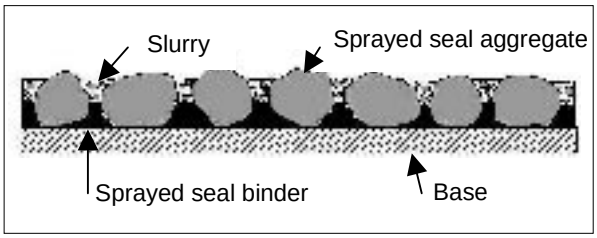

Figure 1. Cape Seal

It is important to recognise that a Cape Seal is not just a sprayed seal with a slurry surfacing over the top, but an integrated treatment where the primary purpose of the slurry is to penetrate and fill voids in the sprayed seal aggregate, rather than provide an additional layer.

In most circumstances the slurry should just fill the surface voids, although an additional application of slurry surfacing may be applied where a very smooth surface is required, for example roads subject to use by snow-clearing equipment.

APPLICATIONS

The primary use of Cape Seals in Australia is in areas where hot mix asphalt is not economically available and where a high resistance to surface shearing forces is required, such as intersections, and other areas involving significant heavy vehicle turning movements. Vulnerable sites include T-junctions, grain silo approaches and road-train turning areas.

Key Summary

This issue of 'pavement work tips' provides a guide to the use of a combination treatment comprising a sprayed seal and slurry surfacing, commonly referred to as a Cape Seal.

In a Cape Seal, the sprayed seal binder provides good waterproofing and flexibility, the sprayed seal aggregate provides wear resistance, and the slurry surfacing provides resistance to surface shearing forces. Although the total cost may be comparable to, or even slightly more than, hot mix asphalt it may still be an economical and cost-effective treatment in some situations.

Figure 2. Typical application at rural T-junction

MATERIALS DESIGN REQUIREMENTS

Best results are obtained with 20 mm aggregate in the sprayed seal. The binder application rate for the sprayed seal is designed as a single/single seal using standard allowances for traffic and surface conditions. In high stress situations, aggregate retention may be improved by the use of polymer modified binders.

Aggregate is spread at a rate that is about 10% less than normal. A lighter spread rate is required to ensure adequate void spaces between aggregate particles for penetration of the slurry.

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The slurry surfacing mix should be appropriate to the traffic application. Generally a microsurfacing slurry mixture with a nominal size of 7 mm and polymer modified binder, is used. Fluidity of the mixture may require adjustment to ensure good penetration of surface voids.

OPERATIONS

The sprayed seal is applied in accordance with standard practice, except that no cutter should be used. Rolling with pneumatic-tyred, multi-wheel rollers should also follow normal practice. Work should only be undertaken in fine, warm conditions.

Figure 3. Work in progress showing sequence of binder aggregate and slurry

To avoid disturbance of the seal, traffic should be excluded until the slurry is applied. The slurry should be applied on the same day as the sprayed seal.

In South Africa, ready availability of manual labour permits significant use of handwork to work the slurry into the sprayed seal aggregate without disturbing it. When spreading slurry with conventional mechanical equipment, care must be taken to avoid rolling and lifting the sprayed seal aggregate and causing it to remain proud of the finished surface.

The following procedure is recommended to minimise risk of damage to the seal:

- Adjust the skirt of the slurry spreader box to the lowest practicable setting so that the wet slurry is only just covering the tops of the aggregate.
- As soon as the slurry is firm enough, roll with a pneumatic-tyred, multi-wheeled roller to push back into place any sprayed seal aggregate particles that may have been disturbed by the skirt of the spreader box.

The slurry should set within a few hours, after which the work can be opened to controlled traffic.

Figure 4. Sprayed seal (left) and finished slurry surface (right)

New work may be susceptible to scuffing in the first few days. It is likely that this will self-heal under traffic. After a few weeks, any surface scuffing should largely disappear and the tops of underlying sprayed seal aggregate become visible through the slurry surface.

SERVICE LIFE

The service life of a Cape Seal will depend on traffic and underlying pavement condition. Experience with Cape Seals in Australia is limited but a life of at least 8 years, and possibly up to 15 years, may be expected on sound pavements.

Figure 5. Typical application – highway climbing lane

REFERENCES

Austroads (2002) Guide to the Selection and use of Bitumen Emulsions, AP-G73/02.

Austroads (2003) Guide to the selection of road surfacings, AP-G66/03.

For more information on any of the construction practices discussed in "pavement work tips", please contact either your local AUSTROADS 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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