

## TREATMENT OF CRACKED ASPHALT OVER CONCRETE PAVEMENTS

### 1. INTRODUCTION

This technical note describes the treatment of cracks in an asphalt surfacing on a concrete pavement.

The basic problems with asphalt above joints in concrete pavement are reflective cracking and spalling of the asphalt surface which relate to:

- differential thermal movement between the asphalt surface and the concrete pavement,
- excessive vertical movement of the concrete slabs,
- lack of control of the cracking above the joint areas,
- changes in level between slabs caused by pumping or differential settlement.

### 2. GENERAL

In all but exceptional cases an asphalt overlay placed above a joint in a concrete slab will crack. The major challenge is to control the cracking to prevent water entry and minimise spalling and associated problems.

The degree of control of the cracking in the asphalt overlay is a function of the type of concrete pavement and the differential movement between the slabs. The following are examples of joint conditions that are often encountered:

- minimal differential movement between the slabs (i.e. slabs with dowelled and/or sawn joints so that there is load transfer between slabs)
- significant differential movement between the slabs (independent slabs, not jointed)
- meandering joint resulting from shrinkage or structural cracking of the slab.

### 3. MINIMAL DIFFERENTIAL MOVEMENT BETWEEN SLABS

Concrete pavements where there is minimal differential movement between slabs are often dowelled or constructed with sawn joints. The cracking that may eventuate in a new asphalt overlay from this movement is initially tolerable but if left uncontrolled the edges may curl due to thermal movements or by debris entering the crack.

The appropriate treatment to minimise this type of cracking is to control it by saw cutting the new asphalt above the

joint in the concrete. The use of a membrane or a SAMI seal on top of the concrete placed prior to asphalt overlaying can further minimise the cracking potential in the asphalt. A sketch of this type of treatment is shown in Figure 1.

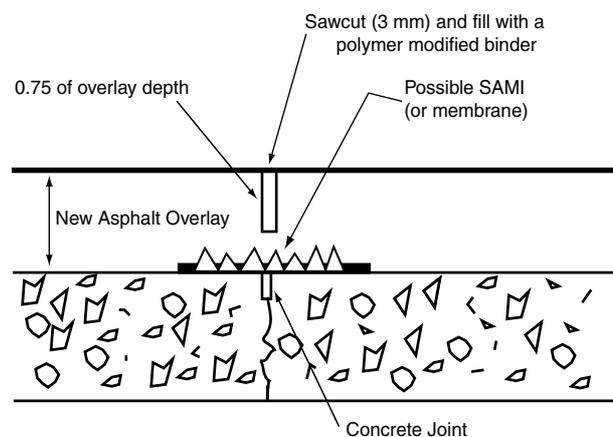


Figure 1: Slabs with minimal differential movement

### 4. SIGNIFICANT DIFFERENTIAL MOVEMENT BETWEEN SLABS

Significant differential movement between concrete slabs often occurs:

- where joints have not been kept waterproof,
- for slabs with water sensitive subgrades,
- for undowelled concrete slabs.

Often the asphalt overlay placed over these concrete slabs will crack in an uncontrolled manner, the asphalt will spall and a wide, open gap will result. This allows water to enter beneath the pavement and further damage the subgrade plus creating a poor riding surface.

The appropriate treatment is to attempt to resupport the concrete slabs by pumping cement grout into the voids beneath the slabs to minimise the differential movement and then treat the joint.

As indicated in Figure 2, the joints should be treated by:

- cleaning out the spalled open gap and preparing a patch about 400 mm in length above the joint,
- reducing the gap between the slabs to about 15 mm or less. This can be achieved by rebuilding the end of one of the slabs and filling the extra space with an

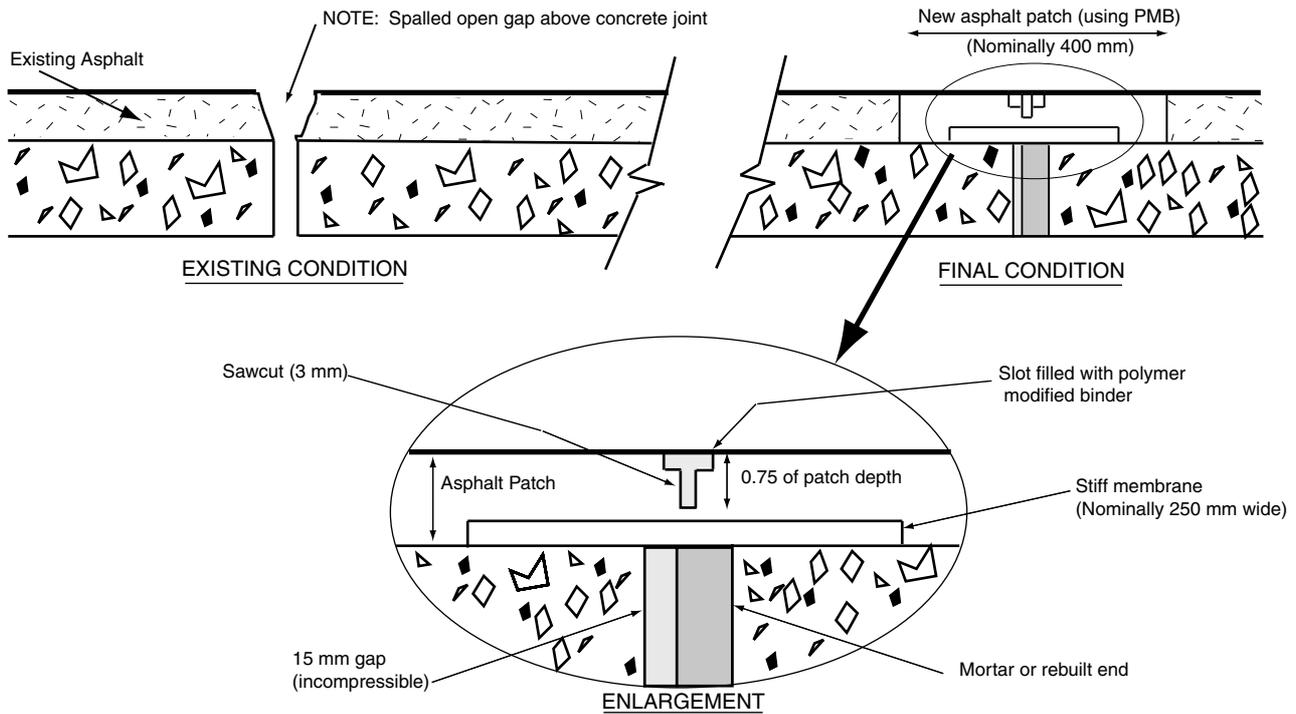


Figure 2: Pavements with wide and spalled joints

incompressible material. Remove a section of the asphalt overlay and:

- place and bond a stiff membrane above the joint,
- place the new asphalt patching material and within 12 to 24 hours create a 3 mm wide saw cut above the original crack,
- create a reservoir about 10 mm wide and 15 mm deep by saw cutting and fill the reservoir with polymer modified binder.

**5. MEANDERING CRACKS**

In an existing asphalt overlay meandering cracks should be treated similarly to cracks where significant differential movement between slabs occurs, except that:

- it is not always practical or necessary to remove the asphalt and place a membrane on the concrete slab provided water can be prevented from entering the joint and the pavement ride quality is satisfactory,
- if practical, the joint should be routed out to about 10 mm width and filled with a polymer modified binder to a depth of about 15 mm. (See Figure 3.)

**6. REFERENCES**

APRG Report No 19 - AUSTRROADS Specification Framework for Polymer Modified binders.

GeoPave Technical Note 5 - HSS, SAM and SAMI Sealing Treatments

**7. CONTACTS**

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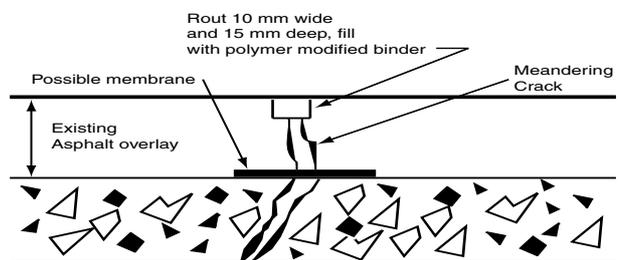


Figure 3: Pavements with meandering cracks

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