

MAP CRACKING

With cement based materials, shrinkage invariably occurs during setting and curing. This is due to the fact that the water content of the material is partially reduced by the evaporation and by cement hydration.

However, for a cement-based topping bonded to base concrete, shrinkage cannot proceed freely and the topping is bound to crack because ordinary cement-based materials have only limited ability to absorb tensile stress. Large cracks in concrete are normally regarded as critical for durability because they allow water to enter, giving rise to frost damage. Even worse, salt solutions can penetrate and attack the concrete. Moreover, in the case of reinforced concrete, a more serious effect of salt is that it can destroy the passivity of the steel reinforcement, creating circumstances in which corrosion may occur.

Desireable

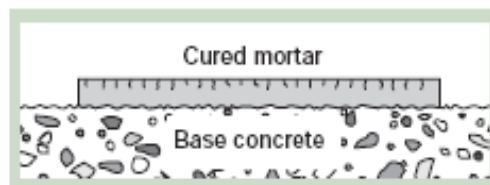


Fig. 2

Undesirable

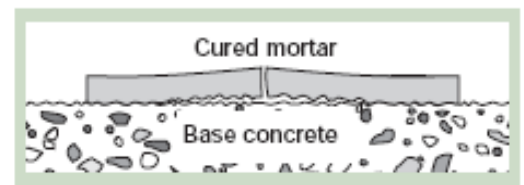


Fig. 1

Cracks in the topping can occur in various patterns. The most undesirable pattern is a few large cracks, because these will inevitably lead to poor bonding in the area around the cracks and thus to possible buckling of the topping (Fig. 1). A desirable pattern of cracking consists of small superficial cracks in the top layer (Fig. 2). Such cracking does not affect the bonding to the base concrete and the individual cracks will be so small that they will have no effect. Such a pattern of cracking is especially desirable when the topping has to be able to follow deflections of the base concrete, e.g. for suspended floors.

A variety of conditions can assist formation of this desirable pattern of cracking:

- Thin layer of topping and low binder content in the topping material.
- Base concrete prepared for optimum bonding.
- Lowest possible evaporation of water from the surface during setting and curing (temperature, humidity, protection against wind or draught).



Map cracking in the Densiphalt materials

Because Densiphalt materials are cement-based, shrinkage will occur during setting and curing. Some cracking is therefore possible, as with any cement based topping bonded to a base concrete. However, it is to some extent possible to control the pattern of cracking in Densiphalt toppings as indicated above, particularly by proper choice of binder content, aggregate and layer thickness, and especially in preparing the base concrete and minimising evaporation once the topping is laid.

All Densiphalt materials contain a shrinkage-compensator but, despite this, a pattern of fine superficial cracks can form upon the surface of the topping. Cracks in the uppermost half-millimetre can be 0.05–0.25 mm wide, but deeper into the topping they become a disjointed system of Micro cracks no wider than a few microns. The larger aggregate particles in the Densiphalt materials will also deflect cracking and limit crack propagation.

Map cracking in Densiphalt materials will not penetrate the toppings and is invisible under dry conditions.



NOTE: Minor superficial map cracking can occur in a Densiphalt topping, but has no effect upon the function or working life of it.