

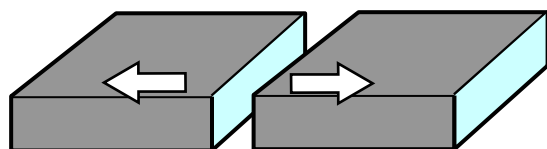
1. Introduction

Over the past decades traffic intensity has grown continuously. In addition, the wheel loads acting on our road surfaces have also increased. Consequently, intense road maintenance measures are required. Replacement and repair cycles are becoming shorter and shorter. Maintenance and renewal works on roads hinder the traffic flow. For this reason, a durable road surface should be provided in the course of repair operations in order to minimise future maintenance.

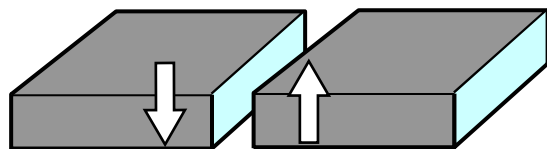
Since 1996 pre-bituminised S&P grids have been successfully used for increasing the durability of asphalt surfaces. The S&P grids reduce fatigue cracks as well as thermal cracking. The S&P carbon fibre grids "S&P Carbophalt" additionally increase the structure value of the bituminous pavement. The carbon fibre grid "S&P Carbophalt" has a structure value equal to that of an asphalt layer measuring 3 – 4 cm in thickness. This establishes interesting rehabilitation options for inner-city areas. For example, an existing old pavement can be cut-milled to a depth of 3 cm and repaired with the carbon fibre grid as well as a new pavement layer of 3 cm. The structure value of the reinforced pavement layer corresponds to a 6 – 7 cm thick layer of non-reinforced asphalt. When milling to a depth of 3 cm the kerb and edge areas are not affected. Because the existing, old level is maintained after the repair job, shafts do not have to be raised. Carbon fibre reinforced thin layers are therefore cost-efficient alternatives for repairing bituminous pavement layers.

Specific maintenance measures are to be implemented in the course of the repair job to prevent damage in future. To avoid plastic deformation of pavement layers, the bitumen type in new layers can be varied. One expedient reinforcing technique is the use of a pavement layer that is resistant to rut formation. Tension members (grid interlayers) are used to prevent structural deformation, fatigue cracks and reflection cracks on existing pavement layers.

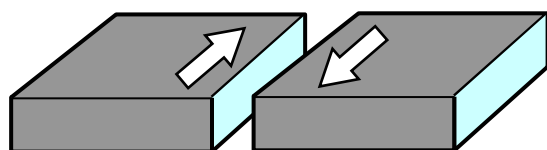
Accounting for the various mechanisms at play in bituminous pavement layers (*Graphic 1*), replacement of such pavement layers should be based on appropriate repair concepts.

**Strain**

⇒ reinforcement in lengthwise or crosswise direction

**Vertical shear**

⇒ For example in existing concrete slabs that undergo bituminous resurfacing of the pavement layer, local stabilisation of the concrete slab is carried out by means of PU injection.

**Horizontal shear**

⇒ Force-locked bonding of old cracks

Figure 1: Mechanisms acting inside asphalt pavement ⇒ repair technique

Figure 1 clearly indicates that the asphalt reinforcement should be combined with other repair techniques.

2. Different types of asphalt pavement interlayers

A distinction is to be made between **SAMI** (**S**tress **A**bsorbing **M**embran **I**nterlayer) sealings and **grid interlayers**. The two systems are often used in combination.

SAMI sealings

Two possibilities are available

- SAMI non-woven
- SAMI surface dressing

Grid interlayers

Conventional grid interlayers are made of different fibre-rovings that form a grid structure. The grid is bitumen-friendly or SBR-coated and partially covered with an adhesive on the bottom side. With conventional grid interlayers of this kind the required layer bonding can only be achieved at the construction site when the mesh opening of the grid is at least 15-20 mm and an additional SAMI surface dressing is provided on the grid interlayer.