

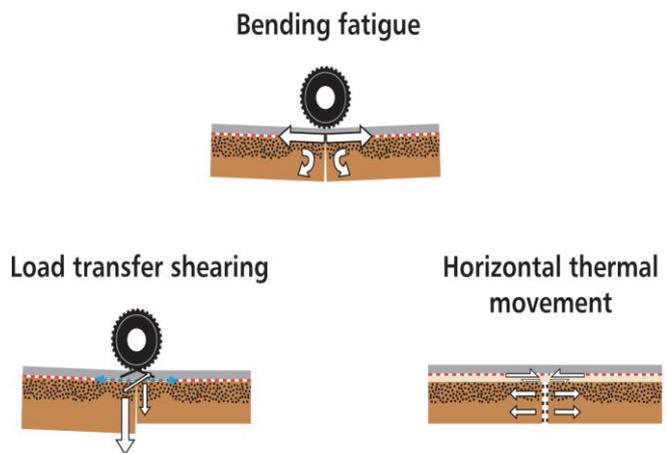
# Tensar Products to extend asphalt life against Reflective Cracking

Effective rehabilitation solutions for fractured pavements using traditional materials involves techniques as different as the granular interlayer proposed by the Asphalt Institute or polymer modified sand carpet type inter-layers. Within the range of solutions, a number of grids and composites have proven effective to mitigate reflective cracking. This Information Bulletin summarises the characteristics of the Tensar asphalt reinforcement products recommended for reflective cracking and the characteristics relevant to reflective cracking resistance. The details of several validation test results are included.

## Reflective cracking mechanism

Reflective cracking is driven by three main mechanisms:

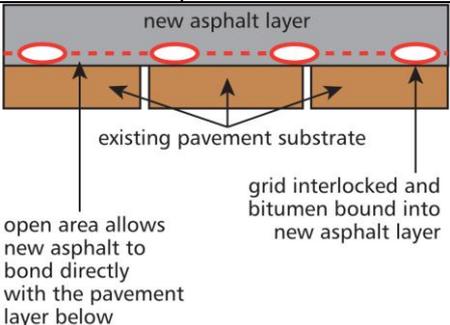
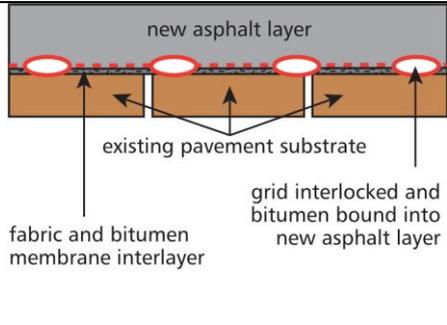
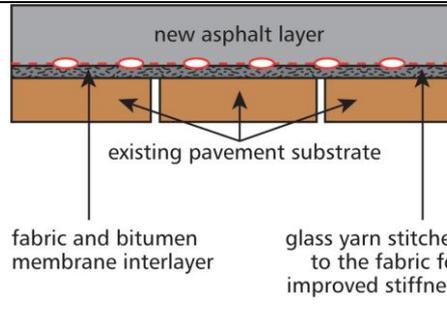
1. Bending Fatigue. A fatigue type of phenomenon, but focused on the crack centre line.
2. Load transfer shearing. Traffic loads are not entirely transferred across cracks, causing a differential vertical movement that can lead to reflective cracking. This loading mode is most severe on concrete slab pavements.
3. Horizontal thermal movement. This is a thermal expansion and contraction of slabs delimited by cracks. This loading mode will be predominant when large thermal fluctuations occur.



## Reflective cracking resistance; Existing solutions

Specialised Tensar reinforcement products for reflective cracking mitigation offer a cost effective alternative to thicker pavement layers. Several grid reinforcement strategies have been developed. All include a reinforcement of the new asphalt layer, but follow different routes to address crack generated stresses, relying; either on a controlled differential movement between layers, referred to as "Stress Relief" (STR); or on load transfer into a well bonded new/old asphalt structure. Two corresponding specific grid reinforcement types have been developed: 1) grid/fabric composite or, 2) open grid. Glass yarn and polypropylene (PP) have proven to be materials of choice to manufacture reflective cracking mitigation grids.

## Functional classification of Tensar asphalt reinforcement product

Interlayer system		
Load transfer	Load transfer & stress relief	Stress Relief (STR)
<p><b>Open Grids</b></p> <p>Asphalt bonds directly through the grid apertures with the pavement layer below</p> 	<p><b>Grids with fabric backing</b></p> <p>Grid primarily reinforce the overlay, while the fabric provides for construction &amp; water barrier</p> 	<p><b>Grid Composites</b></p> <p>Fabric/bitumen membrane interlayer as water barrier and/or for stress relief</p> 
<p><b>AR1</b></p> <p>A PP open grid</p>	<p><b>AR-G</b></p> <p>A PP grid + fabric (+ bitumen)</p>	
<p><b>GlasstexGrid</b></p> <p>A coated glass fibre open grid</p>		<p><b>Glasstex</b></p> <p>A glass yarn grid + fabric (+bitumen)</p>

Each approach can effectively address reflective cracking mitigation issues. Local conditions can dictate the success of one approach over the other. Tensar now offers a comprehensive range of products adapted to the local experience and practice:

### Selection criteria for Tensar asphalt reinforcement products

Characteristics	AR1	AR-G	Glasstex®		Glasstex® Grid		
			P100	P50	GL100	GS 100	GS 50
Open area(*), %	85	NA	NA	NA	60	35	45
Interlayer Water Barrier	No	Yes	Yes		No		
Asphalt cover(**), min., mm	70		40				

\* It is generally accepted that grid open area should be adapted to the asphalt mix particle size. Grids of reduced open area associated with a coarse graded mix may not allow for full layer to layer bonding and may tend to behave as a stress relief membrane.

\*\* Recommended target thickness, may require adjustment depending on local asphalt mix formulations.

### Validation of Tensar asphalt reinforcement products for reflective cracking

The performance of Tensar asphalt reinforcement products for control of reflective cracking has been demonstrated both through laboratory testing and more than 25 years of field experience.

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