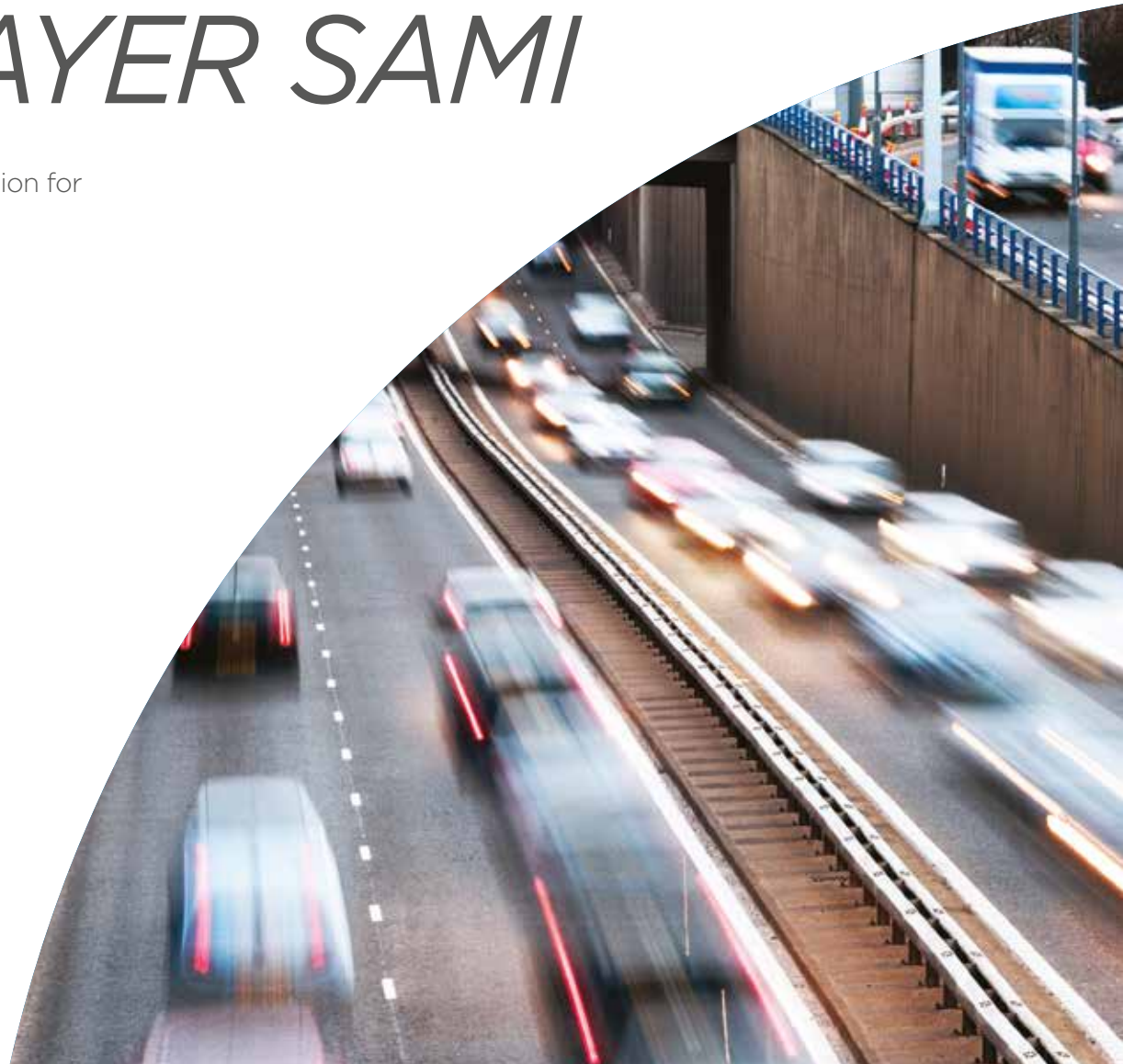



# ***ULTI**LAYER SAMI*

The ultimate surfacing solution for  
concrete pavements





**Tarmac ULTILAYER SAMI offers a proven long-term solution to surfacing concrete pavements.**

Over 1,200km of concrete pavements are thought to be in use on Highways England's strategic road network, with an even greater length in existence across the local authority network.

The asphalts used to overlay this concrete frequently suffer from reflective cracking caused by thermal expansion in the underlying concrete and the effects of traffic loading. This cracking eventually leads to water ingress and failure, requiring costly remedial work and causing delays for road users.

To meet this challenge Tarmac has introduced a high performance asphalt stress absorbing membrane interlayer (SAMI) that is proven to resist these stresses, for long-term protection of the asphalt overlay.

As a dense and highly flexible pavement interlayer, it offers proven long term crack resistance. As a result ULTILAYER SAMI minimises long term repair and resurfacing requirements for a sustainable, cost-effective pavement solution.

Similar asphalt SAMI products have a long history of use overseas where over 2,000km of concrete pavement in China and the United States has been treated.



**ULTIMATE  
SOLUTIONS**

# ULTIMATE RESULTS

## Proven Resistance to Cracking

ULTILAYER SAMI is designed to provide exceptional resistance to cracking in asphalt overlays, caused by movement in underlying concrete or lean mix base layers.

## Improved Asset Management

Extended pavement life, longer resurfacing intervals and lower maintenance requirements mean improved return on investment.

## Low permeability

ULTILAYER SAMI is designed to achieve low insitu voids thereby helping to protect the pavement from water ingress damage.

## Fully recyclable

At the end of the overlay's life ULTILAYER SAMI can be removed by standard cold planing and the arisings can be easily recycled back into hotmix asphalt.

## Longer lasting results

Long term monitoring of completed contracts has shown overlays using ULTILAYER SAMI to outperform conventional asphalt solutions.

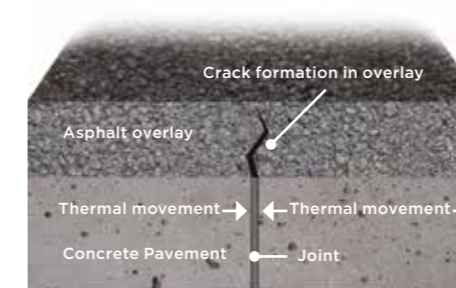
## More sustainable

All Tarmac products are manufactured in the UK and certified under BES 6001 Responsible Sourcing. ULTILAYER SAMI is also designed to be more durable than conventional materials making it a more sustainable long-term solution.

## HOW IT WORKS

Reflective cracking in asphalt laid over jointed concrete is caused by tensile stresses created by movement of the slab joints. This is a combination of both thermal movement in the concrete slabs as the pavement heats up and cools down and traffic induced movement.

CONVENTIONAL ASPHALT OVERLAY



ASPHALT OVERLAY WITH ULTILAYER SAMI



### Thermal movement

As the slabs in a jointed concrete pavement heat up and cool down they expand and contract. This movement is naturally concentrated at the slab joints, and is transferred to the asphalt at these points creating localised tensile stress at the bottom of the asphalt overlay. This cyclical loading causes 'bottom up' cracks to develop in the asphalt. ULTILAYER SAMI is designed to provide exceptional flexibility, to reduce the transfer of these stresses to the asphalt above and therefore offset the development of reflective cracking.

### Traffic induced movement

As heavy vehicles move across from one slab to the next, this creates vertical differential movement which again stresses the asphalt overlay. The resulting tensile stress moves between the top and bottom of the asphalt layer creating the odd situation where both 'bottom up' and 'top down' cracking can in theory both be attacking the asphalt. To counter this Tarmac recommends that a high performance PMB is used in all critical layers over jointed concrete which includes the surface course.

# PROVEN PERFORMANCE



## **A45, Billing, Northampton**

### **CHALLENGE**

A section of the A45 near Northampton was suffering from extensive reflective cracking and required resurfacing. The road consisted of a jointed concrete pavement overlaid with an asphalt thin surfacing.

### **SOLUTION**

The resurfacing contract was based on a geogrid but also contained trial panels of alternative crack resisting systems. These panels included a control section of conventional asphalt and a section of ULTILAYER SAMI. The thinking behind the SAMI was relatively straightforward: a binder rich sandcarpet type asphalt incorporating a heavily modified (elastomeric) PMB achieving low insitu voids.

### **RESULT**

The trial sections were inspected in 2009 and 2010 at 1 and 2 years of age. No discernible faults could be identified in any of the panels (geogrid, control or asphalt SAMI). The site was inspected again in Summer 2014 by which point cracking had started to become visible in the control section. A subsequent inspection in Spring 2015 confirmed that the SAMI section at seven years was still performing as well as the standard detail of geogrid with a polymer modified SMA surface course.

## **Hall Quay, Great Yarmouth**

### **CHALLENGE**

In 2008 the road running beside the River Yare was resurfaced as part of a redevelopment of the area. The existing pavement consisted of asphalt over an old concrete pavement of varying construction and condition with the asphalt deteriorating due to reflective cracking. The remedial solution needed to be highly durable to withstand the additional expected traffic and minimise future maintenance.

### **SOLUTION**

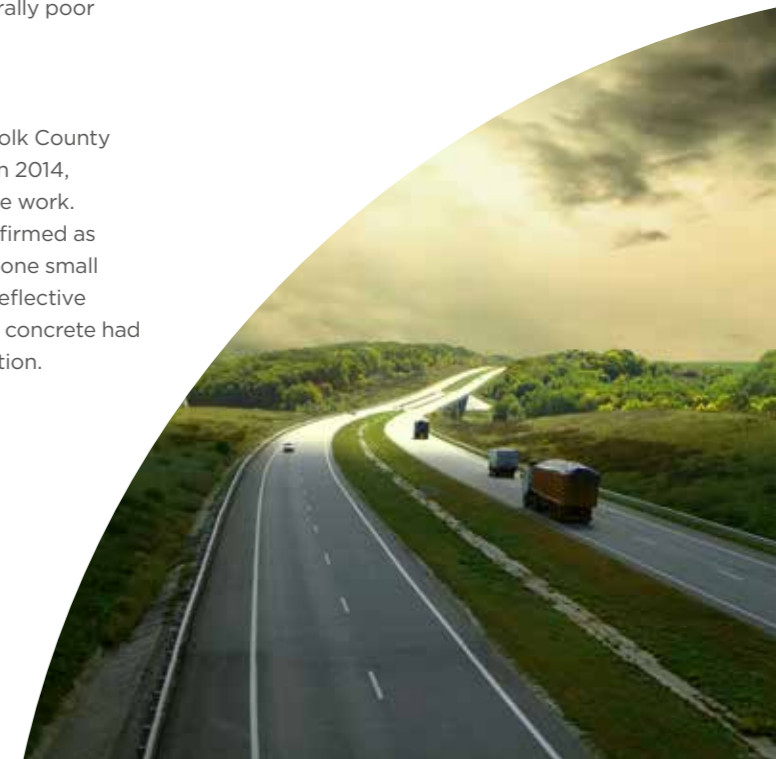
Working with our Technical experts, the client designed a treatment based on the combination of ULTILAYER SAMI, HRA binder course and chipped HRA surface course, all of which incorporated the same heavily modified, elastomeric PMB. The worst of the concrete sections had to be removed and repaired prior to the SAMI layer being placed, however, even after this the concrete was still in a generally poor condition.

### **RESULT**

The site was inspected by Norfolk County Council Highways Laboratory in 2014, six years after completion of the work. The pavement overlay was confirmed as performing very well with only one small section suffering from limited reflective cracking, where the underlying concrete had been in particularly poor condition.

*"This was an excellent example of collaborative work with our surfacing contractor in 2008. The excellent performance of the overlay, including the SAMI layer, was a key confidence builder leading up to the Scole Bypass contract in 2013 where around 60,000m<sup>2</sup> of concrete road was overlaid with a SAMI based solution."*

Bob Noakes, Manager of Norfolk County Council's Highways Laboratory





**EXPERT ADVICE  
AND SUPPORT**

No two roads are exactly the same. This is particularly the case for the complex issue of designing asphalt overlays for jointed concrete pavements. If your assessment is that other traditional (non structural) treatments such as geogrids are appropriate then ULTILAYER SAMI will also work well.

**Typical Applications**

ULTILAYER SAMI (Stress Absorbing Membrane Interlayer) is a fine graded asphalt containing a high proportion of premium Polymer Modified Binder (PMB). It is typically laid 25mm thick and is designed to offer exceptional flexibility. When tested by University of Nottingham's Nottingham Transport Engineering Centre (NTEC) as part of a wider investigation into SAMI performance, ULTILAYER SAMI was shown to have fatigue resistance properties over 200 times better than conventional asphalt.

ULTILAYER SAMI should be laid directly onto the concrete pavement where the tensile stresses induced by these movements are typically the highest and where conventional asphalt would quite rapidly develop cracking. It is best used where thermally induced 'bottom up' cracking dominates. It is also a valuable solution for lean mix based pavements where it can help prevent underlying movement from causing damage to the asphalt overlay.

## OUR SUPPORT

### FAQs

#### *What is the difference between ULTILAYER SAMI and the other ULTILAYER products?*

ULTILAYER SAMI is specifically designed for overlays onto jointed concrete. It can also be used when overlaying lean mix based pavements, where cracking is a problem, or over old asphalt layers where the client has indicated the need for a geogrid approach.

#### *What surface course can ULTILAYER SAMI be used with?*

ULTILAYER SAMI can be used with a wide range of surface courses. When combined with one of our advanced polymer modified asphalts it forms a complete overlay system for concrete pavements.

#### *How does it work?*

ULTILAYER SAMI incorporates fine graded aggregate and a high performance Polymer Modified Binder (PMB) for exceptional flexibility that accommodates differential movements in the underlying concrete pavement.

#### *Do Tarmac supply concrete repair solutions?*

ULTILAYER SAMI should not be considered a long term solution for concrete pavements that are structurally unsound and require significant strengthening. Specialist concrete repair products are available from our Pozament range.

#### *How long will ULTILAYER SAMI typically last?*

Current data / trials in the UK demonstrate that ULTILAYER SAMI is lasting as long as geogrids.

#### *What are the sustainability benefits?*

ULTILAYER SAMI is completely recyclable and is manufactured using responsibly sourced materials in accordance with BES 6001 standards. By extending pavement life, it also offers a more sustainable solution.



## MORE ANSWERS

For more information about Tarmac ULTILAYER SAMI contact your local regional office or visit [tarmac.com](http://tarmac.com)

For all Tarmac Contracting enquiries contact:

**01773 815 100**

Portland House Bickenhill Lane  
Solihull Birmingham B37 7BQ

0800 1 218 218 **TARMAC.COM**



©2018 Tarmac Trading Limited.

'ULTILAYER', 'Tarmac' and the 'circle logo' are registered trademarks.

