IMAGE A: *GlasGrid was installed at the National Center for Asphalt Technology (NCAT) pavement test track in Opelika, AL.*

Research Quantifies the Benefits of the GlasGrid® System

The use of interlayers for preventing reflective cracking has been extensively studied over the last 40 years. A number of research projects have quantified the benefits of the GlasGrid® System and helped to define its areas of application (Table 1).

TEXAS A&M UNIVERSITY

At the Texas Transportation Institute (TTI) at Texas A&M University, studies using the Large-Scale Overlay Test and the Beam Fatigue Test (opposite page) on reinforced asphalt beams have demonstrated a two- to three-fold improvement in the life of a GlasGrid System-reinforced overlay compared with an overlay constructed using the same thickness of unreinforced asphalt.

NATIONAL CENTER FOR ASPHALT TECHNOLOGY

The National Center for Asphalt Technology (NCAT) at Auburn University features a 1.7-mile long test track (Image A). An unreinforced and a GlasGrid System-reinforced paved section were trafficked. After 40 million ESALs (Equivalent Single Axle Loads) over more than a decade, distresses were clearly evident in the unreinforced section, while the reinforced section showed no signs of distress cracks.

THE UNIVERSITY OF NOTTINGHAM, UK

An interface bond test was used to measure the quality of the bond between various interlayers and the asphalt. The test results strongly suggest that the presence of a fabric – and not grids – results in a significant reduction in the interface shear stiffness and therefore also a reduction in performance. Semi-continuously supported notched beam tests were also conducted to determine the ability of interlayer materials to resist crack propagation (Table 2).

EMPA LABORATORY, SWITZERLAND

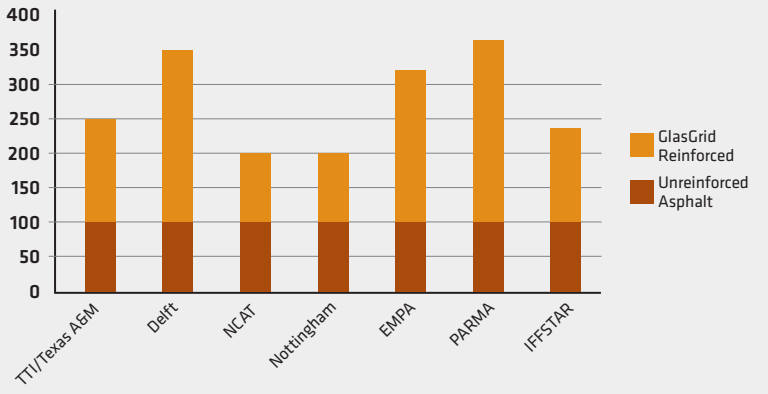
At this national Swiss laboratory, the GlasGrid System was tested with a model accelerated pavement testing device (MMLS3) that induces a unidirectional load on the pavement to simulate traffic loading. The test determined that the GlasGrid System-reinforced slabs have a durability approximately three times longer than the control slab. Visual inspection of the reinforced slabs showed that the cracks were interrupted and arrested along the reinforcing grids.

UNIVERSITY OF PARMA, ITALY

The objective of this research was to quantify the effectiveness of the GlasGrid System to affect fatigue cracking and extend pavement service life. Center-point bending tests were conducted using beam and slab samples designed to simulate bottom-up cracking. On the beam tests, the GlasGrid System-reinforced samples provided about 1.5 times higher maximum load than the unreinforced samples, and GlasGrid® TF-reinforced beams withstood at least twice the fracture energy of the GlasGrid System-reinforced beams. On the slab tests, GlasGrid System-reinforced samples provided more than one and a half times greater maximum load than the unreinforced samples, while the GlasGrid TF-reinforced slabs required at least three times higher strain to failure compared to the GlasGrid System-reinforced samples.

IFFSTAR TESTING FACILITY, FRANCE

The fatigue benefits of a 100 kN/m GlasGrid System were evaluated at the IFFSTAR facility, a circular full-scale accelerated pavement test track located in France. Crack percentage was determined by the ratio between the length of pavement with cracks and the initial length. The test was run until the extent of cracking increased such that the control section was too damaged to continue, which occurred at 1.2 million cycles. At this point, the control section exhibited a cracked area of 70%, while the GlasGrid System-reinforced section exhibited less than 10% cracking.



Unreinforced asphalt sections have been normalized to one for clarity

TABLE 1

GlasGrid® TF-Reinforced Pavement Lasts Up to Five Times Longer than Unreinforced Structures

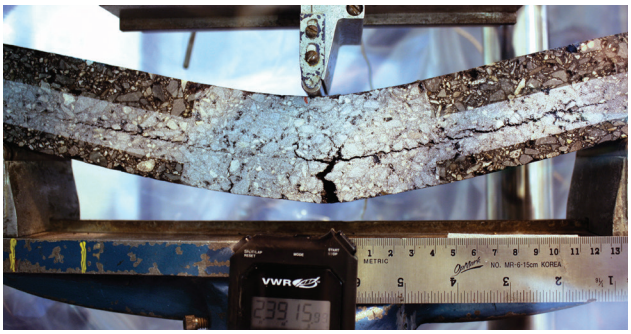
Engineers at the Saint-Gobain ADFORS Research and Development Center conducted a series of AASHTO-recognized cyclic loading tests to quantify the effective fatigue life and crack retardation properties of unreinforced (CRS-2P tackcoat), GlasGrid® System-reinforced (CRS-2P tackcoat) and GlasGrid® TF-reinforced asphalt composite beams. Beams measuring 2.5 in. x 2 in. x 15 in. were tested to failure. Three samples of each type of beam were tested.

Results show that the samples reinforced with GlasGrid TF outperformed not only the unreinforced beams but also the beams reinforced with the original GlasGrid System product. These tests demonstrated that GlasGrid TF offers a significantly longer effective fatigue life, improving resistance to fracture of the overlay system by effectively withstanding cracks at the grid interface. Fatigue life was enhanced by the quality of the tack film bond to the overlay due to the presence of GlasGrid TF's elastomeric tack film.

Specifically, the measured fatigue life ratio was:

- Unreinforced beam: 1.0
- GlasGrid System-reinforced beam: 3.3
- GlasGrid TF-reinforced beam: 5.1

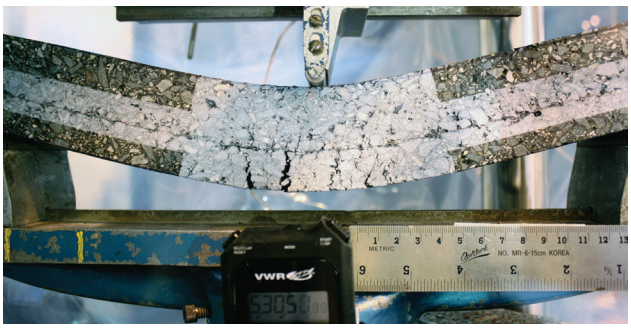
An unreinforced asphalt pavement beam with a conventional tack coat predictably cracks under stress in a short period of time.



The original GlasGrid System with a conventional tack coat successfully redirects cracking to extend pavement life.

Products	Interface Shear Stiffness (MPa/mm)	Interface Shear Stiffness (psi/in.)
Open Grid Type 1	24.7 (68%)	90,994
Composite Grid Type 1	8.1 (22%)	29,840
Composite Grid Type 2	14.3 (40%)	52,681
GlasGrid	36.4 (100%)	134,096
Composite Grid Type 3	14.1 (40%)	51,944

TABLE 2: *Reported values of interface shear strength and stiffness completed at University of Nottingham, UK.*



GlasGrid TF provides a superior bond in the pavement cross-section to minimize cracking and maximize performance.