WE’RE KNOWN FOR OUR STRENGTH
Working with our Partners…
HaTelit High Strength Geosynthetic Paving Interlayers for Asphalt Reinforcement
Managing Expectations-Value Proposition

We Want to Extend Pavement Performance by Delivering a Solution to...

- Retard Reflective Cracking
- Limit Water Intrusion
- Increase Asphalt Strength
- Improve Ride Quality
- Maintain Base Structure Integrity
- Safety
- Provide Cost Effective Solutions
Why Consider HaTelit??

An asphalt reinforcement grid with the following properties:

- Unique High Tensile Modulus Polyester
- Exceptional dynamic load qualities
- Bituminous coated strong bond with asphalt
- High Retained Strength
- Eliminate (reduce) Milling
- Millable - Recyclable
HaTelit® C 40/17

- Optimum retardation of reflective cracking (40-year track record)
- Very high resistance to installation damage-retained strength
- High resistance to long-term dynamic traffic loads
- No loss of strength due to moisture & time
- Creates a moisture barrier

<table>
<thead>
<tr>
<th>Property</th>
<th>HaTelit® C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elongation at break</td>
<td>&lt; 10%</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>50 kN/m</td>
</tr>
<tr>
<td>Bitumen (% residual)</td>
<td>&gt; 60%</td>
</tr>
<tr>
<td>Tensile strength after installation damage test (DIN EN ISO 10722))</td>
<td>&gt; 90%</td>
</tr>
<tr>
<td>Ratio of strength of damaged specimen to nominal strength of reinforcement grid</td>
<td>&gt; 80%</td>
</tr>
<tr>
<td>Raw material</td>
<td>Polyester</td>
</tr>
<tr>
<td>Cuttable</td>
<td>Yes</td>
</tr>
<tr>
<td>Roll length</td>
<td>150 m</td>
</tr>
<tr>
<td>Roll width</td>
<td>Up to 5 m</td>
</tr>
<tr>
<td>Mesh size</td>
<td>4 cm</td>
</tr>
</tbody>
</table>
Why Polyester???

Coefficient of thermal expansion of Asphalt and Polyester are compatible in combination...
Ratio of the coefficient of thermal expansion $\alpha$ [1/K]:

- $\alpha$-Concrete: $\sim 1.0 \times 10^{-5}$
- $\alpha$-Steel: $\sim 1.3 \times 10^{-5}$
  - Ratio: $\sim 1 / 1$

- $\alpha$-Asphalt: $\sim 6.0 \times 10^{-4}$
- $\alpha$-Polyester: $\sim 8.0 \times 10^{-5}$
  - Ratio: $\sim 1 / 7$

- $\alpha$-Asphalt: $\sim 6.0 \times 10^{-4}$
- $\alpha$-Fiberglass: $\sim 4.5 \times 10^{-6}$
  - Ratio: $\sim 1 / 133$
Recognizing Pavement Distresses - Determinant for Product Application Selection
Caution! Not all conditions appropriate!

Typical Pavement and Base Failures

Extreme Fatigue Cracking

Slab Fracture

Photo F
Rutting-Mix Design Problems

Typical Binder Issues
Fatigue “Alligator” Cracking
Pavement Deterioration Curve

Extend Years of Good Life (Yr Y – Yr X):
Delay Structural Rehab

Original Pavement

HMA Overlay w/ Interlayer

Time For New Overlay
Possibly Recycle

Failed Pavement

HMA Overlay Only

The HUESKER Interlayer Advantage

Pavement Condition

Excellent

Good

Fair

Poor

Pavement Age (Time In Years)
Interlayer Installation: How it Works

- **NEW EXTENDED LIFE ASPHALT SURFACE**
  - Delays Reflective Cracking
  - Reinforces Overlay
  - Limits Moisture Intrusion
Reasons for reflective cracking

Dynamic loading effects

- Shear action +
- Bending action
- Shear action -
Reasons for reflective cracking

Temperature change
Reflective cracking

Crack growth

- Stresses into the new asphalt layer
- Due to high tension at crack tip

“0” Tensile Strength in HOT MIX ASPHALT

Functional Aspect of Reinforcement Grids

Significantly reduced growth of reflective cracks, as the reinforcement grid absorbs and distributes the strain.

AERONAUTICS TECHNOLOGICAL INSTITUTE

Dynamic Fatigue

Testing Done to Determine the Effect of HaTelit® in Anti Reflective Cracking Applications in Asphalt overlays
Set-up (2000):

- **Material:** HaTelit® C 40/17
- **Precrack:** 3 mm, 6 mm, 9 mm
- **HaTelit®-position:** 2 mm above the crack tip
- **Load position:** Bending and shear mode
- **Contact pressure:** 330 kN/m², 420 kN/m², 560 kN/m² (max. value)

(1) Overlay
(2) Blocks with opening
(3) Elastic base (rubber)
Bending Mode

Typical crack
Without reinforcement

N=79,884
Typical crack (with HaTelit®)

N=503,832
Bending Mode

Bending mode
(without HaTelit®)
Bending Mode

Bending mode
(with HaTelit®)
Finite Element Modeling

Without HaTelit

With HaTelit
**Improvement Factor**

\[ V_f = \frac{N_f \text{(with Hatelit ®)}}{N_f \text{(without Hatelit ®)}} \]

\[ N_f = \frac{1}{c_{f1}} \]

\[ c_{f1} = \frac{1}{N_f \text{(B)}} + \frac{2}{N_f \text{(S)}} \]

\[ 4.60 < V_f < 6.14 \]

- \( N_f \) = Number of cycles
- \( c_f \) = Fatigue life of the beam
- \( N_{f(B)} \) = Fatigue life of beam with the load in the bend mode
- \( N_{f(S)} \) = Fatigue life in the shear mode
Demand Performance: Bond Strength

A proper bond strength results from...

Interlock

Adhesion

Friction

...Allows the interlayer to perform...
Demand: Bond Strength

Material reinforcement achieved by proper bond strength by:

- Interlock
- Adhesion
- Friction
- Grid Aperture Size
- Bituminous coating
- Mesh size and coating
Reduce Milling Thickness—Save $$

HUESKER Interlayers can eliminate the need for a leveling course...saving time & $$

Competitive Glass Grids – Leveling Req.

HaTelit Flexible-Conforming

Fiberglass Grid

Milling Course

HaTelit® C 40/17
“Best Practice”-Material Installation

1. Surface Preparation
   Ensure surface is clean, dry, and free of any loose material. Fill all surface cracks larger than 1/8 inch with a sealant.

2. Tack Coat
   PG grade asphalt tack applied at 0.10 gal/yd² uniformly OR Emulsified asphalts evenly applied at 0.13-0.18 gal/yd² and allowed to break before installing the grid.

3. Installation
   Materials should be installed with a laydown machine with a pipe inserted through the core. Care should be taken to prevent creases or folds in the grid.
Surface Preparation

After milling existing asphalt surface, ensure milled surface is clean, dry and free of any loose material. Fill all surface cracks larger than 1/8 inches with a sealant.
Surface Preparation
….Be Prudent…Really?

…contractor must have been paid by If
Cleaning / Sweeping
“Tacking” the Pavement

PG 64-22(AC-20) applied at 0.10-0.12 gal/yd² uniformly on cleaned milled surface. NO streaking is key to ensure bonding...full coverage
Tack-Emulsified Asphalt

Emulsion evenly applied at 0.13 to 0.18 gal/yd² (70 % residual bituminous) and allowed to “break” before installing the grid.

Changes from Brown to Black
Delamination and Slippage - Lack of Tack and Asphalt Thickness....

Lack of Tack and Thickness Can Cause Issues in Surface
Installation

The material should be installed using a laydown machine...a steel pipe in the core, ensuring no folds / creases are present eliminating catenary effect (bending / bowing)
Installation

Edge Milled surface
Material Installation

Broom Pressure Ensures No Wrinkles and Contact Bond
Final Paving

Proper Overlay Thickness

Good Bond …

Material Saturation…
...Contact Information

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