Geosynthetic Pavement Interlayers
Building longer lasting, more maintenance free pavements

Overview of paving interlayer functions that preserve and extend the life of asphalt pavements and provide reduced maintenance, to stretch every paving budget dollar

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Tensar Roadway Maintenance
This overview is offered to provide general information on the construction and functional capabilities of paving interlayers and how each functions within the pavement section to delay deterioration, offering longer life, reduced maintenance cost and higher performing asphalt pavements. For the specific physical properties of each interlayer, manufacturing specifications and installation guidelines, please contact the interlayer manufacturer directly.
It can be a real challenge for those dedicated to delivering the best performance for every roadway dollar spent, whether building new roads or maintaining existing. Each region has its own challenges with weather, environmental and traffic conditions that exist and the capabilities and materials with which to work. Determining the forces that accelerate roadway deterioration for the given region is the first step to understanding the best solutions to delay and mitigate the impact of those forces. This becomes increasingly important as the budgets for many agencies continue to decrease while the rate of roadway deterioration increases and most are left with an ever increasing inventory of roads with declining PCI ratings and cost of repair continue to go up. Slowing the rate of deterioration when building new roadway or rehabilitating old roads is the quickest way to move the roadway inventory to a higher PCI rating. The cheapest insurance and single quickest way to slow the rate of deterioration and effectively manage the roadway inventory is to include the highest performing paving interlayer within the hot mix asphalt pavements that the budget will allow. There are now very cost effective paving interlayer options that offer more advanced tensile reinforcement capabilities that will significantly extend the life and performance of the hot mix paving, whether it is a new pavement or the overlay rehabilitation of an old road.

Use of these high performing, high tensile paving interlayers can:

Delay crack return and reduce crack filling and maintenance cost by up to 6 times longer than the same pavement with no interlayer.

Per Cedergren work, using a high performing paving interlayer that forms a moisture barrier and keeps the base dry can add up to 50% longer life to that roadway.

**STUDY THAT SHOWS INTERLAYER IN-PLACE PERFORMANCE**
Forces that accelerate pavement deterioration

1. As pavements age and become embrittled, cracks develop within the pavement. 2. Loading, thermal movement, freeze-thaw and continued aging exaggerate the cracks and moisture moves into the base. 3. The rate of deterioration accelerates rapidly, due to loss of load bearing capacity of the base with moisture intrusion causing loss of structural value. 4. Traffic loading with heavier loads and more traffic counts, accelerates the rate of deterioration. It is not the cracks you see, but what is happening in the base below that creates the greatest loss of pavement life.

Paving Interlayer Functionality that inhibits Pavement Deteriorating Forces

1. An interlayer that provides a moisture barrier delivers the greatest protection from rapid pavement deterioration by keeping top down moisture out, preserving the structural value of the pavement base. 1. An interlayer that provides the ability to absorb and reinforce, delivers the critical capability to disperse crack forces, delaying crack return and severity. Interlayers that provide reinforcement, limit elongation, for very efficient transfer of crack force energy into and dispersing them within the interlayer. This provides the greatest delay of crack return and severity. 3. Finally, a strong, efficient, reinforcing interlayer adds flexural strength to the total pavement structure diverting and distributing the point load more effectively within the interlayer.
Impact of Moisture Intrusion into Base

Graphic from the Cedergren study shows that a pavement with base saturated as little as 10% of the time (37 days in a year) will lose nearly 50% of its useful life!

Interlayer Prevention of Moisture Intrusion into Base

Graphic shows how an interlayer creates a moisture barrier to stop top down moisture intrusion.
Graphic shows interlayer types and their appearance

Interlayer System Functions

When installed per manufacturers recommendations

- **Forms a moisture barrier**
- **Absorbs and/or disperses crack forces**
- **Provides reinforcement**
- When milled the RAP can be recycled back into a new mix

Graphic of the critical interlayer functions needed to delay pavement deterioration
### Interlayer Selection by Function

<table>
<thead>
<tr>
<th>Function</th>
<th>Moisture Barrier Membrane</th>
<th>Crack Stress Relief and Delay Stress Absorbing</th>
<th>Crack Stress Relief and Delay Tensile Reinforcement</th>
<th>Mills + Recycles into new mix</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stress Absorbing Geosynthetic Interlayer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabric</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polypropylene</td>
<td>YES</td>
<td>Low</td>
<td>NO</td>
<td>Maybe*</td>
</tr>
<tr>
<td><strong>Fiberglass Tensile Reinforcing Geosynthetic Interlayers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiberglass/Polyester</td>
<td>YES</td>
<td>Med</td>
<td>Up to 50kN</td>
<td>YES</td>
</tr>
<tr>
<td>Composite Grid</td>
<td>YES</td>
<td>Med-High</td>
<td>Up to 100kN</td>
<td>Maybe*</td>
</tr>
<tr>
<td>PreCoated Self Adhesive</td>
<td>NO</td>
<td>High</td>
<td>Up to 200kN</td>
<td>YES</td>
</tr>
<tr>
<td>PreCoated Self Adhesive TF</td>
<td>YES</td>
<td>Max High</td>
<td>Up to 200kN</td>
<td>YES</td>
</tr>
</tbody>
</table>

*Claim is that when fully saturated with asphalt will mill and recycle completely. Need independent confirmation.

Graphic used to help select an interlayer by functions needed to maximize delay of deterioration.

Directions: 1. Select the functional capability of the interlayer desired across the top.
2. Choose the product the meets the most important and greatest number of functions desired

**TYPICAL PAVING INTERLAYER INSTALL**

Minimum HMA overlay thickness is 1.5", but specifying 2" overlay thickness is recommended, to reduce the risk of thin spots of less than 1.5". If possible and budget allows, it is best to overlay with thicker overlay thickness so the wear surface can be milled and replaced without disturbing the interlayer that provides the moisture barrier protection.
Guide to Selecting the Right Paving Interlayer

To select the correct interlayer and maximize the benefit that an interlayer can provide, it is important to understand pavement deteriorating forces and how interlayers function to mitigate that deterioration.

1. Selecting an interlayer that provides a moisture barrier when installed provides the greatest protection against pavement deterioration by preserving the base structural value:
   Moisture saturated base is the leading cause of pavement deterioration. The Cedergren study found base saturated as little as 10% of the time (37 days out of the year) will reduce pavement life by nearly 50%! It further indicates that in asphalt pavements, up to 50% of the moisture intrusion into the base is from top down.

2. Selecting an interlayer that provides efficient, high tensile reinforcement will achieve the highest level of crack delay and reduced crack severity:
   Crack propagation is the leading cause of moisture intrusion into the base leading to the loss of the load bearing capacity and structural integrity of the pavement base.

3. Selecting an interlayer that provides efficient, high tensile reinforcement will achieve the highest level of load distribution and flexural strength improvement, to extend the pavement life:
   Traffic loading and loss of flexural strength increases the rate of deterioration of the pavement.

4. Selecting an interlayer that provides reinforcement will limit elongation and achieve the highest level of crack delay plus reduced severity and increased point load distribution for flexural strength improvement and the greatest extension of pavement life:
   Elongation exceeding 5% is detrimental in the ability of the tensile to quickly engage and reinforce to delay cracks and to reduce their severity. Reinforcement improves traffic load distribution and flexural strength, to delay the rate of pavement deterioration.

This is a simplified overview to show the overall concept of selection, but selecting the correct interlayer requires many more considerations to maximize deterioration delay and optimize pavement protection.
This Cost / Benefit Calculator is for one specific paving mat product and is available electronically so different interlayers, local market pricing and desired thickness and cost of overlay can be input to calculate for a specific project or market.

For your electronic copy email: drogers@tensarcorp.com
Agency Users of Paving Interlayers who have given permission to call:

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