

Paving Fabrics – Are They Right For Your Project?

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By Ray Myers

Water, Water, Everywhere

The major cause of Roadway deterioration is water beneath the pavement. The source of the water can be either rainfall or irrigation. Water softens the subgrade and typically reduces pavement structural capacity by about 60%. A pavement, which is saturated as little as 10% of the time, will only have 50% of the life of a pavement with a dry base. Most of this water enters through cracks and pores in the pavement. According to AASHTO, the number ONE cause of pavement deterioration is water intrusion through the pavement. NOTE: FHWA states that ½ to 2/3's of the water that strikes an asphalt surface passes through the A/C and into the base.



Paving fabrics have just under 40 years of successful documented history in improving pavement performance and increasing pavement life.

Paving fabrics are a nonwoven, needlepunched polypropylene fabric used as a *water proofing membrane*. Since introduction in the late 60's by the PHILLIPS PETROLEUM CO., a product they trade named PETROMAT®, nearly 40 years of successful documented history of improving pavement performance and increasing pavement life has been recorded. Today there are many manufacturers of paving fabrics. All are classed as *waterproofing membranes* or *paving fabrics* or *reinforcing fabrics*. Approximately 100 million square yards are placed annually. Properly installed, the system extends pavement life in three ways:

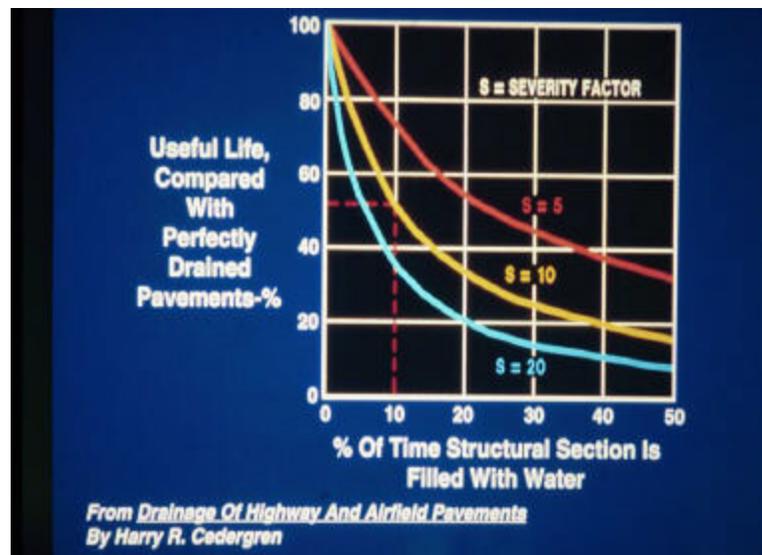
1. Waterproofing membranes substantially eliminate the number ONE cause of pavement deterioration, water intrusion *through* the asphalt.
2. Fabric Interlayers slow reflective cracking from existing asphalt or concrete pavements. FHWA studies show that cracks

as small as 1/8 inch will allow 97% of the water striking the pavement to pass through to the base.



Slight movements associated with old cracks or joints are dissipated by the membrane. More importantly, even if the crack reflects through, the membrane remains intact and continues to *waterproof*.

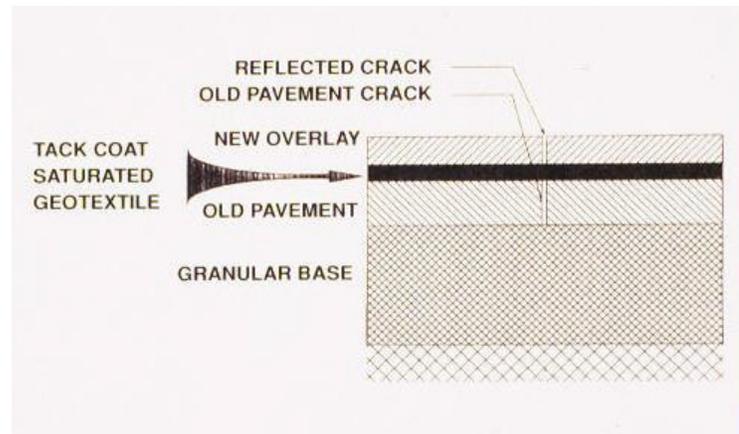
3. Lastly, paving fabrics increase the fatigue life by 100% to 300%. Asphalt is a flexible pavement and research has shown that pavements with a paving fabric can flex two to three times more before fatigue failure.



They provide a new wear surface and a waterproofing membrane at substantially less cost than asphalt overlay.

The Fabric of Paving Fabrics

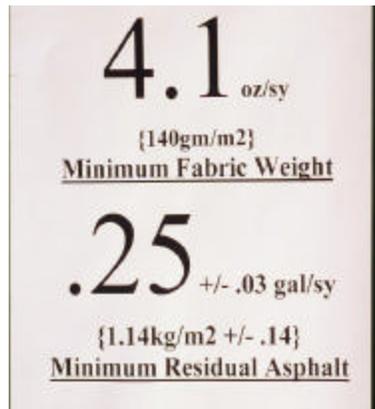
A paving fabric waterproofing system is comprised of 2 components: a nonwoven needlepunched fabric, usually polypropylene, heat bonded on one side, and a liquid asphalt tack coat. The system can be used under AC overlays and under chip seals. Chip seals over paving fabrics have been used very successfully since the mid 80's. They provide a new wear surface and a waterproofing membrane at substantially less cost than asphalt overlay. Agencies also use rubberized asphalt with paving fabrics. Rubberized asphalt brings many benefits to the user; however, the most successful applications are gap graded and consequently are very porous. To reduce the introduction of water into the base a fabric interlayer is needed. The two products work together very effectively.



Constructing an AC Overlay with a Paving Fabric Stress Absorbing Membrane System

The paving fabric is placed with the heat-bonded side (shiny side) on top and the fuzzy side down to reduce asphalt bleed through. In 1996, the industry established a 4.1-ounce per square yard fabric as the optimum weight. Lighter weight fabrics can cause bleeding and heavier fabrics can fail to fully saturate. The fabric must be fully saturated with liquid asphalt to accomplish waterproofing. Tests show that .25 gallons per square yard is the minimum amount of liquid asphalt needed to saturate the fabric AND provide sufficient binder to tack the old and new asphalt. This amount can be lowered to .22 when the existing asphalt is very smooth but must be increased to .30 for very rough asphalt. Cold-planed surfaces are good candidates for paving fabrics and an example of pavement that should have the highest tack rate. Fabrics should be placed on the full width of the road. Emulsions are *not* recommended, as they are typically 40% water. Therefore, the application rate must be increased 40% (emulsion's low viscosity makes this very difficult) and the water must be allowed to evaporate (turn from brown to black) before placing the fabric.

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The major cause of system failures is inadequate tack, which often occurs when users incorrectly reduce the tack coat application rate to combat bleed through on hot days. Doing so can result in the overlay eventually shoving or delaminating.

There are 6 correct ways to reduce bleed through as the temperature rises:

1. Be sure to use the AASHTO 4.1 oz/sy fabric
2. Increase viscosity of the tack, e.g. go from AR-4 to AR-8
3. Reduce embedment temperature
4. Reduce embedment pressure. The paving fabric need only be in contact with the tack asphalt. It does not need to be forced down into the tack. Pushing the fabric into the binder can increase the possibility of bleeding.
5. Accomplish work in coolest hours of day or night
6. If items 1-5 are adhered to and bleeding still occurs, the ultimate solution is to broadcast a very thin layer of A/C over the in-place fabric. This will keep construction equipment from picking up the fabric.

Properly installed fabric interlayers can be recycled in exactly the same manner as traditional asphalt.

Surface Preparation

Surface preparation for interlayers includes removing all water, dirt and debris from the existing pavement. Remove any sections of the asphalt deflecting under vehicular load or being loose. Cracks of ¼” or larger need to be filled prior to applying the fabric. Projects should not proceed when the ambient temperature is less than 50F and rising and the pavement temperature is less than 40F and rising. Fabric should be placed without excess wrinkles. Wrinkles over 1” should be cut and lapped in the direction of paving. Laps should not exceed 4-6” and also lapped in the direction of paving.

Together, the paving fabric and the tack coat become a performing system when the heat and pressure of the asphalt concrete overlay draws the asphalt cement tack into the fabric forming an asphalt saturated interlayer.

Together, the paving fabric and the tack coat become a performing system when the heat and pressure of the hot mix asphalt overlay draws the asphalt cement tack up into the fabric. To assure saturation in the case of chip seal over fabric, the fabric is rolled into the tack with pneumatic rollers before the chip seal is placed. To obtain full moisture barrier protection, the paving fabric is recommended over the **full width** of the pavement. 1 - 1/2” of *compacted* asphalt is the minimum recommended thickness of the overlay. Thinner lifts do not provide enough heat and seldom are adequately compacted.

The majority of pavements are constructed with poor draining bases. Therefore the life of the pavement is greatly improved by waterproofing paving fabrics that do NOT allowing the water to pass through the asphalt into the base.



For More Information

Need help with you particular application? The Asphalt Interlayer Association is a nonprofit organization whose purpose is to promote waterproofing membranes through quality installations

For specifications, seminars, inspection training, inspection kits or technical support call; (800) 650-2342 or e-mail ray@rginc.com



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