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Fabric

Interlayer

Application



Fabric Interlayer Application Checklist

This checklist is one of a series created to guide State and local highway maintenance and inspection staff in the use of innovative pavement preventive maintenance processes.

The series is provided through the joint efforts of the Pavement Preservation Program of the Federal Highway Administration (FHWA) and the Foundation for Pavement Preservation (FP²).

FHWA uses its partnership with FP², the American Association of State Highway and Transportation Officials, and State and local transportation agencies to promote pavement preservation.

To obtain other checklists or to find out more about pavement preservation, contact your local FHWA Division Office or FP² (at www.fp2.org), and check into these FHWA web pages:

www.fhwa.dot.gov/preservation

www.fhwa.dot.gov/infrastructure/asstmgmt/resource.cfm

Fabric Interlayer Application Checklist

Purpose

Proper application of a paving fabric (fabric) interlayer, immediately prior to the placement of a hot-mix overlay (overlay) or chip seal over flexible pavement.

Preliminary Responsibilities

Project Review

- Is this project a good candidate for a fabric interlayer?
- What is the existing pavement section?
- What are the average daily traffic and equivalent single wheel axle loads?
- Is rutting present? If so is the rutting due to asphalt mix instability?
- Is the pavement structurally sound?
Fabrics are appropriate for a structurally sound pavement that is aged or oxidized.
- Is cracking present? If so, to what extent?
Alligator and Block Cracking: Fabric is appropriate for slight and moderate conditions.
- Are there surface irregularities? Does this pavement need a leveling course?
- Do other pavement stresses exist? If so, to what extent?
 - Raveling
 - Polished aggregate
 - Flushing/ Bleeding
 - Other
- Have drainage deficiencies been corrected?
- If this is chip seal over fabric project and the project location has a 3-month average ambient low temperature of $<15^{\circ}\text{F}$ ($<-9.4^{\circ}\text{C}$), it is not a candidate for fabric placement under chip seal.
- Is this a cost effective solution?

Document Review

- Project (standard) specifications
- Special provisions
- Construction manual
- Traffic control plan
- Manufacturer's instructions
- Agency requirements
- Material Safety Data Sheets
- Bid/plan quantities

Material Review Checks

Paving Grade Asphalt (Fabric Binder)

(Note: Fabric binder is an interchangeable term for paint binder and tack coat)

- Paving grade asphalt is specified for fabric binder – emulsion is not recommended.
- Fabric Binder is delivered from an approved source.
- Fabric Binder delivery ticket specifies grade for use on the project.
- Fabric Binder temperature is within the specified range.

Fabric

- Fabric label complies with agency requirements.
- Fabric property requirements should meet AASHTO Designation: M 288-96, or approved equal.

Preapplication Inspection Responsibilities

Surface Preparation

- Fill cracks wider than 0.25 inch (6.25 mm) to control crack reflection.
- Make certain that the pavement surface is clean and dry.
- Repair all structural distresses.
- Assure that all public improvements are protected with temporary covers (e.g., utility access covers, concrete surfaces, etc.)
- Assure that all road delineators, pavement markers (ceramic, plastic, tape, etc.) and thermoplastic striping are removed.
- Take measures to prevent fabric binder from entering drainage facilities.

Equipment Inspections

Distributor Truck

- Distributor truck is properly calibrated (see “Checking Fabric Binder Application Rate”).
- Spray bar is at the proper height to provide triple coverage from spray nozzles.
- Proper size nozzles are installed on the spray bar.
- Nozzles are unplugged and apply fabric binder at the specified rate.
- Nozzles are parallel and angled 15 to 30 degrees to the centerline of the spray bar.
- Shield installed on end of spray bar, or end nozzles are perpendicular to the centerline of the spray bar, to provide clean outside edge lines.
- Distributor truck is equipped with radio for communication with project supervisor and tractor fabric applicator (if used).
- Distributor truck is computer rate controlled.

Fabric Applicator (Mounted on Distributor Truck or Tractor)

- Metal bar is available for use on fabric applicator.
- If necessary, insert metal bar inside fabric core to prevent fabric rolls from sagging.
- Roll brake keeps fabric taut during application.
- Broom bristles are present across full width of fabric roll, and are uniform in length.
- Broom can be adjusted vertically to apply proper pressure.
- Tractor fabric applicator, if used, is equipped with radio for communication with project supervisor and distributor truck.

Sand Applicator (Use on Chip Seal Projects)

- The sand serves as a bond breaker and prevents contact between tires and the fabric binder. This can happen due to fabric binder bleeding to the fabric surface, etc.
- Sand should be spread by a mechanical spreader at a uniform rate by 2 to 6 pounds per square yard (1.1 to 3.3 kilograms per square meter).

Pneumatic-Tired Rollers (Use on Chip Seal Projects)

- Pneumatic-tired rollers are used to seat the fabric into the fabric binder.
- Size, weight and number of pneumatic-tired rollers are specified.
- Roller tires size, rating and air pressure comply with specifications.
- Tires have a smooth surface.
- If sand is not used, rollers are equipped with a spray system, with check valves on nozzles, to apply parting agent to tires.

Job Site Considerations

Job site considerations include, but are not limited to:

- When fabric is placed in milled surfaces, cleaning or power brooming the milled surface is critical and binder spreading rate may need to be adjusted to compensate for milled surface.
- Fabric placement should be limited to vertical grades of 10 percent, or less.
- Areas to avoid for overlay projects: bubble portion of cul-de-sacs, intersection radii, and last 100 feet (30.49 meters) where vehicles come to a stop.
- Areas to avoid for chip seal projects: bubble portion of cul-de-sacs, intersection radii, last 100 feet (30.49 meters) where vehicles come to a stop, horizontal curves with a radius of 200 feet (60.98 meters) or less, or areas that convey water (e.g., dip section).
- Fabric should be placed on the same day as the overlay or chip seal, unless the fabric is maintained overnight.

Fabric Rolls

- Fabric rolls are stored on a dry surface to prevent exposure to water.
- Protective plastic covers remain on fabric rolls to prevent exposure to the sun.
- Identifying tags are on plastic covers (tags identify lot numbers, size and style number specified for use on the project).

Weather Requirements

- Fabric should be placed at the same ambient/pavement temperatures required for subsequent placement of overlay or chip seal.
- Fabric application does not begin if rain is likely during overlay construction operations, or from fabric placement to 24 hours after chip seal application.
- Overlay projects: fabric can be placed at ambient temperatures acceptable by specified state agency.
- Chip seal projects: fabric placement should not be placed on the same day as a chip seal and should conform to state agency specifications.
- High winds could affect uniform application of fabric binder.

Determining Fabric Binder Application Rate

- Agency guidelines and requirements are followed.
- If no guidelines, design, or requirements for application rate are provided, then use the following:
 - Overlay projects: apply 0.23 to 0.28 gallon per square yard (1.06 to 1.3 liter per square meter). (gal div by .26 then x 1.2)
 - Chip seal projects: apply 0.28 to 0.35 gallon per square yard (1.3 to 1.6 liter per square meter).
- Application rate is dependent on surface conditions, surface cracks, and ambient/pavement temperatures.
- Contact fabric manufacturer for the application rate that is appropriate for your project site.

Traffic Control

- Signs and devices are in place before operations begin.
- Signs and devices used match the traffic control plan.
- Placement complies with local agency regulations or the federal Manual on Uniform Traffic Control Devices (MUTCD).
- Pilot car leads traffic slowly, 25 miles per hour (40 kilometers per hour) or less, through the construction zone.
- Assure that construction and public traffic is not placed on fabric binder.
- Due to safety concerns and potential damage to fabric, traffic is not recommended on fabric. If traffic must cross the fabric, sand or hot mix is broadcast on the fabric to prevent tires coming in contact with underlying fabric binder.

- Signs are removed or covered when they no longer apply.
- Unsafe conditions are reported to a supervisor.

Project Inspection Responsibilities

Fabric Binder Application

- Fabric binder temperature is within the required application range.
- Application is uniform.
- Check for plugged nozzles, drilling or streaking.
- Random checks of application rates are performed.
- Distributor truck is stopped if any problems are observed.
- Fabric binder applied 2 to 4 inches (50 to 100 mm) beyond all fabric edges. (inch div by 0.04 = mm)
- Longitudinal joints are placed on lane delineation.

Checking Fabric Binder Application Rate

The distributor truck should be calibrated to insure the fabric binder is being applied as directed in the field. The contractor can provide a certification to the agency that each distributor truck has been calibrated prior to beginning work; or each distributor truck can be calibrated in the field when work begins. If calibration is done in the field, Method A or Method B below can be used to determine if each distributor truck's application rate is consistent with what is being directed in the field.

Method A

- Park distributor truck on level ground; read tank gauge and note quantity of fabric binder in gallons.
- Measure off a known area of a test section.
- Have the distributor truck apply fabric binder to the test section.
- Park distributor truck on level ground; read tank gauge and note quantity of fabric binder in gallons.
- Subtract the two numbers to obtain the gallons of fabric binder applied.
- Divide the gallons applied by the square yardage covered by fabric binder asphalt; the result equals the application rate (gallons per square yard).

Method B

- Record the weight of pan or hardboard test unit, either 1 foot square (75 square centimeters) in size or 1 yard square (0.83 square meters) (Weight 1).
(1 sy div by 1.2 = 0.84 sm) (1 sf div by 0.16 = 75 sc)
- Place the pan or hardboard test unit on the road surface.
- Have the distributor truck apply fabric binder over the pan or hardboard test unit.

- Record the weight of the pan or the hardboard test unit and fabric binder (Weight 2).
- Subtract Weight 1 from Weight 2 to obtain the weight of applied fabric binder.

Fabric Applications

- For chip seal projects: If using a tractor fabric applicator, the tractor must place fabric immediately behind the distributor truck.
- Fabric is placed fuzzy (non-heat bonded) side down, directly on fabric binder and completely covers starting and ending point; any fabric not bonding at starting or ending point is removed.
- Fabric is taut across the width of the fabric roll.
- Fabric binder extends 2 to 4 inches (50 to 100 mm) beyond all fabric edges. (inch div by 0.04 = mm)
- Overlay Project Joints:
 - Longitudinal: 2 to 4 inches (50 to 100 mm) overlap
 - Transverse: 2 to 4 inches (50 to 100 mm) overlap in direction of the paving machine.
- Chip Seal Project Joints:
 - Longitudinal: 2 to 4 inches (50 to 100 mm) overlap.
 - Transverse: Butt joint, do not overlap
- Fabric is broomed immediately after placement.
- Broomed fabric is free of wrinkles.
- Prior to placing an overlay, wrinkles greater than 1 inch (25 mm) in height should be cut and lapped in the direction of the paving machine. (1 in div by 0.04 = mm)
- Prior to placing a chip seal, wrinkles greater than 0.25 inch (6.25 millimeters) in height should be removed.
- Check fabric roll's brake setting if longitudinal wrinkles appear – wrinkles should not appear during fabric placement.
- Avoid development of fabric folds when approaching horizontal curves.
- Avoid shrinking across fabric width due to over tensioning of fabric rolls.

Sand Application

- If the overlay or chip seal is not placed the same day as the fabric, fabric should be sanded, the same day as fabric placement, to prevent tires or the public coming in contact with the fabric binder. Sand coverage should be maintained until the overlay or chip seal is placed.
- Chip seal projects:
 - If field conditions warrant, sand is applied to prevent contact between tires and fabric binder - do not reduce application of fabric binder, this prevents fabric saturation.

- Sand is applied immediately behind fabric placement, after removal of excess wrinkles, and prior to rolling operations.
- Sand is applied uniformly at 2 to 6 pounds per square yard (1.1 to 3.3 kilograms per square meter).

Broadcast Hot Mix Asphalt (Overlay Projects)

If field conditions warrant, broadcast hot mix asphalt (or sand) on fabric to prevent contact between tires and fabric binder – do not reduce application of fabric binder, this prevents fabric saturation and also reduces the amount of tact needed for the overlay to bond to the fabric surface.

Fabric Embedment (Chip Seal Projects)

- Pneumatic rubber-tired rollers begin rolling immediately after fabric placement, or sand application if used.
- Rollers are staggered to provide immediate coverage over the full width of fabric.
- Roller speed is 5 miles per hour (8.06 kilometers per hour) or less.
- Avoid damaging the fabric with gradual starts, stops, and turns.
- Prior to chip sealing, fabric is continuously rolled to obtain maximum saturation; this may take more than 3 passes.

Opening Fabric Application to Traffic

Due to safety concerns and potential damage to the fabric, traffic is not recommended on fabric before the application of the overlay or chip seal, unless the following precautions are taken:

- Overlay projects: broadcast asphalt concrete to prevent tires from coming in contact with fabric and underlying fabric binder.
- Chip seal projects: broadcast sand to prevent tires from coming in contact with fabric and underlying fabric binder. All excess sand must be removed prior to the application of the chip seal binder.
- After fabric placement and prior to overlay or chip seal placement, maintain traffic speeds at 25 miles per hour (40.32 kilometers per hour), or less, to prevent damage to the fabric. This can be done with the use of pilot cars.

Sand Removal

- Remove sand from fabric surface immediately prior to placing overlay or chip seal. Suggested methods of removal are mobile pick-up brooms, or kick-brooms.
- Repair any damage to the fabric prior to placing overlay or chip seal.

Insufficient Fabric Saturation (Overlay)

It is instrumental for the success of the project that the fabric is saturated in order for the overlay to bond to the fabric. If an inadequate amount of fabric binder is placed, this will cause the overlay to delaminate at a future date.

Insufficient Fabric Saturation (Chip Seal)

- If fabric is not saturated from underlying fabric binder, application of chip seal emulsion must be increased to complete fabric saturation and provide enough emulsion on the fabric surface to retain chips.
- To determine if fabric is saturated, construct a test strip. Apply chip seal emulsion over the fabric for approximately 8 to 10 feet (2.44 to 3.05 meters) in length, and full width of the fabric roll. Observe for 5 minutes to see if emulsion remains on the fabric surface or is absorbed by the fabric. If fabric absorbs the emulsion and an adequate amount remains on the fabric surface, then increase the emulsion application rate to allow for fabric absorption and to provide enough emulsion on the fabric surface to retain chips.

Cleanup Responsibilities

- Fabric cores and remnants are removed.
- Upon completion of placing overlay or chip seal, remove all exposed fabric binder.

Common Problems and Solutions

(Problem: Solution)

The following suggestions are made to address common problems and meet project requirements.

- Wrinkles in the Fabric
 - Insert metal bar inside fabric core to prevent fabric rolls from sagging.
 - Adjust roll brakes to maintain proper tension on fabric roll.
 - Cut and overlap fabric on horizontal curves to prevent wrinkles.
 - Do not use rolls that were rolled improperly at the factory.
 - Make sure fabric applicator is parallel to the traffic lane; veering to the left or right can cause wrinkles.
- Excessive fabric binder spattering.
 - Check the spray bar pressure.
- Non-uniform application of fabric binder:
 - Check temperature of fabric binder.
 - Check viscosity of fabric binder.

- Check nozzle size is appropriate for application rate.
- Insure nozzles are aligned properly.
- Check height of spray bar.
- Check spray bar pressure.
- Determine if any nozzles are plugged.
- Clean or replace nozzle tips.
- Back flush distributor bar.

- Fabric binder bleeding or flushing through fabric:
 - Check application rate of fabric binder.
 - Broadcast hot mix on fabric (overlay projects)
 - Broadcast sand on fabric (overlay or chip seal projects)
 - Reduce application rate of fabric binder as long as the minimum specified amount of fabric binder is maintained.
 - Check down pressure of brooms on fabric applicator.
 - Check fabric weight.
 - Check viscosity of fabric binder.
 - Ambient and/or pavement temperatures may be too high; broadcast hot mix or sand as mentioned above.

- Fabric not bonding at longitudinal or transverse joints:
 - Fabric binder not applied 2 or 4 inches (50 to 100 millimeters) beyond fabric edges.
Reapply fabric binder to the fabric surface, wherever this occurs, to complete fabric saturation.
 - Check broom pressure on the fabric applicator to insure pressure is uniform across the full width of the fabric roll.

Sources

Information in this checklist is based on or refers to the following sources:

- Distress Identification Manual for Long-Term Pavement Performance Project*, Strategic Highway Research Program, National Research Council, SHRP-P-338, 1993.
- Guidelines for Using Geosynthetics with HMA Overlays to Reduce Reflective Cracking*. 2003. College Station, Texas. Texas Transportation Institute. Texas A&M University.
- Manual of Uniform Traffic Control Devices*, 2009 Edition. Washington, D.C.: Federal Highway Administration.
- Pavement Restoration Installation Guidelines for Mirafi® MPV*. TenCate Mirafi.
- Paving Fabric Interlayer as a Pavement Moisture Barrier*. 1999. Transportation Research Circular Number #-C006, ISSN 0097-8515. Committee on geosynthetics
- Petromat Installation Guide*. Propex Fabrics.
- AIA Product Knowledge*, www.aia-us.org

For more information about pavement preservation, visit these Web sites:

www.fhwa.dot.gov/preservation/

www.fhwa.dot.gov/infrastructure/asstmgmt/resource.cfm

<http://www.pavementpreservation.org/>

www.fp2.org/

www.aia-us.org

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