

**Pavement Preservation
Checklist Series**

13

Slurry Seal

Application

Checklist



U.S. Department
of Transportation
**Federal Highway
Administration**

Slurry Seal 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 partnerships with FP², the American Association of State Highway and Transportation Officials, and State and local transportation agencies to promote pavement preservation.

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www.fhwa.dot.gov/preservation

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

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Slurry Seal Application Checklist

Preliminary Responsibilities

Document Review

- Bid documents, e.g., plans and specifications
- Special provisions
- Mix design information
- Construction manual
- Traffic control plan
- Manufacturers' instructions
- Material safety data sheets

Project Review

- Verify that the project is a good candidate for slurry seal by confirming the absence of any alligator cracking, indicative of subgrade failure or inadequate subsurface drainage.
- Verify that surface cracks wider than 1/8 in. (3 mm) are sealed.
- Verify that any surface rutting is 1/4 in. (6 mm) or less in depth.
- Verify that the bitumen application rate is reduced slightly for areas that are flushed or bleeding relative to areas that are not flushed or bleeding
- Verify that the type of slurry seal (Type I, II, or III) proposed is consistent with the severity of raveling present and the estimated traffic.

Note: Type I (#200 x 1/8 in. [3 mm]) aggregate mixtures are typically used for maximum crack penetration and sealing minor raveling within areas of low traffic volume. Type II (#200 x 1/4 in. [6 mm]) aggregate mixtures are typically used to stabilize moderate to severe raveling conditions in moderate traffic conditions. Type III (#200 x 3/8 in. [9.5 mm]) aggregate mixtures are typically used to correct severe surface raveling within heavily trafficked areas.

Materials Checks

- Verify that the compatibility of the aggregates with the proposed asphalt material has been confirmed.
- Verify that a mix design using the aggregate and asphalt onsite has been completed.
- Verify that the emulsion is being delivered from an approved source in accordance with the contract documents.
- Verify that the emulsion delivered to the site has been sampled, submitted for testing, and meets specifications in accordance with the contract documents.
- Verify that the storage temperature of the emulsion is in accordance with contract documents, i.e., generally less than 82 °C (180 °F).

- Verify that the aggregate has been sampled and submitted for testing in accordance with the contract documents.
- Verify that the aggregate delivered to the site meets the criteria of the contract documents.
- Verify that the onsite stockpiles of aggregate have not become segregated by wind or rain or contaminated with deleterious materials.
- Verify that the onsite stockpiles of aggregate are well drained and not inundated with water.

Pre-Seal Inspection Responsibilities

Surface Preparation

- Verify that the existing paving surface is dry and cleaned of all deleterious materials.
- Verify that all surface distresses are repaired.
- Verify that the existing paving surface has been inspected for detrimental effects of poor drainage.

Equipment Inspections

Broom

- Verify that bristles are the proper length in accordance with the contract documents.
- Verify that the broom can be adjusted vertically to avoid excess pressure.

Slurry Seal Machine

- Verify that the slurry seal machines are fully functional.
- Verify that the slurry seal machines are calibrated and certified for the specific aggregate delivered to the site.
- Verify that the spreader rubbers are clean and not worn.
- Verify that the ribbon mixer blades/paddles in the pugmill are intact and not worn.
- Verify that the spreader box is a slurry seal type box and that the surface of the spreader rubber is clean.

Rollers

- Verify that the onsite pneumatic nine-tire rollers weigh between 9 and 11 T (10 and 12 t) dead weight.
- Verify that the roller size, tire rating, and tire pressure comply with the contract documents.
- Verify that all tires are inflated to the same pressure. Typically, tires are inflated to a pressure between 350 and 425 kPa (50 and 60 lbf/in²) for tightening of the slurry seal surface.
- Verify that all tires are smooth surfaced.

Equipment for Continuous-Run Operations

- Verify that the contractor has the full line of equipment onsite that will afford continuous operation, e.g., loaders and tankers.
- Verify that the equipment is free of all leaks, e.g., hydraulic and oil.

- ❑ Verify that the flow boys or other nurse truck units are clean and functional.
- ❑ Verify that there are sufficient flow boys or other nurse truck units (three to five) to afford continuous running with minimal stops for cleaning box rubbers.

Weather Requirements

- ❑ Verify that the air and surface temperatures are a minimum of 4 °C (40 °F) by checking at one of the coolest locations along the project site prior to beginning work.
- ❑ Consider that variations in temperature, humidity, and wind conditions will all affect breaking and curing times; typically, specifications will require that fog is not present during construction operations.
- ❑ Ensure that application of emulsion does not occur or continue if rain is likely.

Adjusting Application Rates

- ❑ Verify that guidelines and requirements of the contract documents are being followed.
- ❑ Verify that the application rate is adjusted relative to the moisture content of the existing surface, e.g., reduced slightly for moist pavement and increased slightly for dry pavement.
- ❑ Verify that the application rate is increased slightly for pavement surfaces that are dried out or porous.

- ❑ Verify that the application rate is increased slightly for low traffic volume pavements relative to the rate for higher volume pavements.
- ❑ Verify that the application rate is reduced slightly for smooth, nonporous, or asphalt-rich pavement surfaces.
- ❑ Verify that bulking has been measured and accounted for.

Traffic Control

- ❑ Verify that the traffic control plan complies with the contract documents and with the *Federal Manual on Uniform Traffic Control Devices*.
- ❑ Verify that the signs and devices erected on the roadway match the traffic control plan contained in the contract documents.
- ❑ Ensure that flaggers do not hold traffic for extended periods.
- ❑ Ensure that flaggers do not hold traffic stopped on freshly placed material.
- ❑ Ensure that signs are removed or covered when they no longer apply.
- ❑ Ensure that an appropriate action plan is developed and implemented for emergency vehicles passing through the project.
- ❑ *Ensure that any unsafe conditions are reported to a supervisor or the appropriate law enforcement officials.*

Project Inspection Responsibilities

Slurry Seal Application

- Verify that a test strip has been successfully placed.
- Verify that field tests have been correctly obtained and that the test results satisfy the requirements of the contract documents.
- Verify that each application “run” is smooth and uniform and not irregular or wavy.
- Verify that each application run begins and ends with straight longitudinal edges.
- Verify that the machine takes a straight, even line with minimal number of passes to cover the entire pavement.
- Verify that the machine is traveling at the proper speed (no faster than a “brisk” walking pace).
- Verify that no “drag” marks are present due to oversize aggregate or dirty rubbers.
- Verify that rubbers are cleaned regularly and at the end of each day’s use.
- Verify that the consistency and application of the mix is uniform.
- Verify that the mix does not “float” fines.
- Verify that the completed roadway surface has an even and uniform texture.
- Verify periodically the application rate of the mix by checking the amount of aggregate and emulsion used.

- ❑ Verify that the time between application and opening the finished surface to foot and vehicle traffic is sufficient for the mix to have properly cured. (Note: It is possible to adjust the cure time of the mix for traversing intersections or high traffic areas that cannot be taken out of service for even relatively short periods of time.)

Longitudinal Joints

- ❑ Verify that the first application run begins along the lower (elevation) edge of the pavement and that subsequent runs are made upslope until the entire width of the pavement is covered.
- ❑ Verify that a longitudinal joint is made along the centerline of the roadway crown.
- ❑ Verify that longitudinal joints between adjacent runs are not located within the wheel path of traffic.
- ❑ Verify that a longitudinal joint is made by overlapping the previously placed material not more than 76 mm (3 in.).
- ❑ Verify that the inside runners of the slurry unit spreader box are adjusted so that the spreader box does not run on the fresh mat.

Rolling (if required)

- ❑ Verify that rolling of the freshly placed mat does not begin before the mat has “cured” sufficiently to support the load without tracking.

- ❑ Verify that rolling begins along the down-slope edge and proceeds upslope, taking care to roll the joint. Overlap of the joint is not a problem.
- ❑ Verify that the entire finished pavement surface is rolled once but not more than twice.
- ❑ Ensure that the roller travels slowly, not more than 13 to 14.5 km/h (8 to 9 mi/h).

Truck Operation

- ❑ Verify that all emulsion applications begin and end on building paper.
- ❑ Verify that the mixture is not overly wet at startup such that the slurry material runs onto the adjacent pavement surface.
- ❑ Verify that each application begins and ends on building paper to form a straight transverse joint.
- ❑ Verify that building paper is disposed of properly.

Transverse Joints

- ❑ Verify that trucks are staggered across the surface of the fresh seal such that trucks do not drive in the same wheel path as the previous truck.

Brooming

- ❑ Verify that brooming does not begin until a sufficient bond has developed between the emulsion and the aggregate.

- ❑ Verify that brooming begins only after the slurry seal material has cured to the point that it is considered adequate to be opened to vehicle traffic.
- ❑ Verify that brooming does not dislodge aggregate or patches of applied slurry seal surface.
- ❑ Ensure that pavement surface is re-broomed if raveling is severe or traffic level is higher than anticipated.

Opening the Slurry Seal Surface to Traffic

- ❑ Ensure that traffic proceeds slowly, i.e., 40 km/h (25 mi/h) or less, over the freshly sealed surface.
- ❑ Ensure that speed limit signs are used when pilot cars are not used.
- ❑ Ensure that after brooming, pavement markings are placed.
- ❑ Ensure that all construction-related signs are removed.

Cleanup

- ❑ Ensure that all loose aggregate from brooming is removed from travelway.
- ❑ Ensure that excess emulsion and spill materials are removed from the site and disposed of in accordance with the contract documents.

Common Problems and Solutions

(Problem: Solution)

❑ Drag marks:

1. Clean rubbers.
2. Check aggregate gradation for oversized aggregates.
3. Check specific gravity of production aggregate for agreement with design.

❑ Flush surface:

1. Reduce total fluids of mix.
2. Reduce asphalt emulsion content of mix.
3. Increase filler/additive.
4. Reduce water content and increase filler/additive.
5. Increase time prior to release to traffic.

❑ Uneven surface—washboarding:

1. Spreader box is set up incorrectly
2. Mix is breaking up too fast.
3. Ambient temperature is too high.
4. Use water spray preceding spreader box.
5. Viscosity of mix is too high.
6. Increase water content.
7. Check specific gravity of production aggregate for agreement with design.

❑ Poor joints:

1. Too much water at startup.
2. Runners of spreader box running on fresh slurry—use water spray.
3. Use building paper to delineate joint.

❑ Excessive gravel:

1. Mix is breaking and curing too slowly.
2. Make mix faster; increase filler/additive.
3. Control traffic.
4. Traffic or equipment speed too high—slow down.
5. Brooming or trafficking before the emulsion is properly set.

Sources

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

AEMA Basic Asphalt Emulsion Manual; 3rd ed. 2004. Annapolis, MD: Asphalt Institute/Asphalt Emulsion Manufacturers Association.

Manual on Uniform Traffic Control Devices. 2003. Washington, DC: Federal Highway Administration. Available at <http://mutcd.fhwa.dot.gov>.

Recommended Performance Guidelines for Emulsified Asphalt Slurry Seal Surfaces, A105. May 2005. International Slurry Seal Surfacing Association.

For more information on the Pavement
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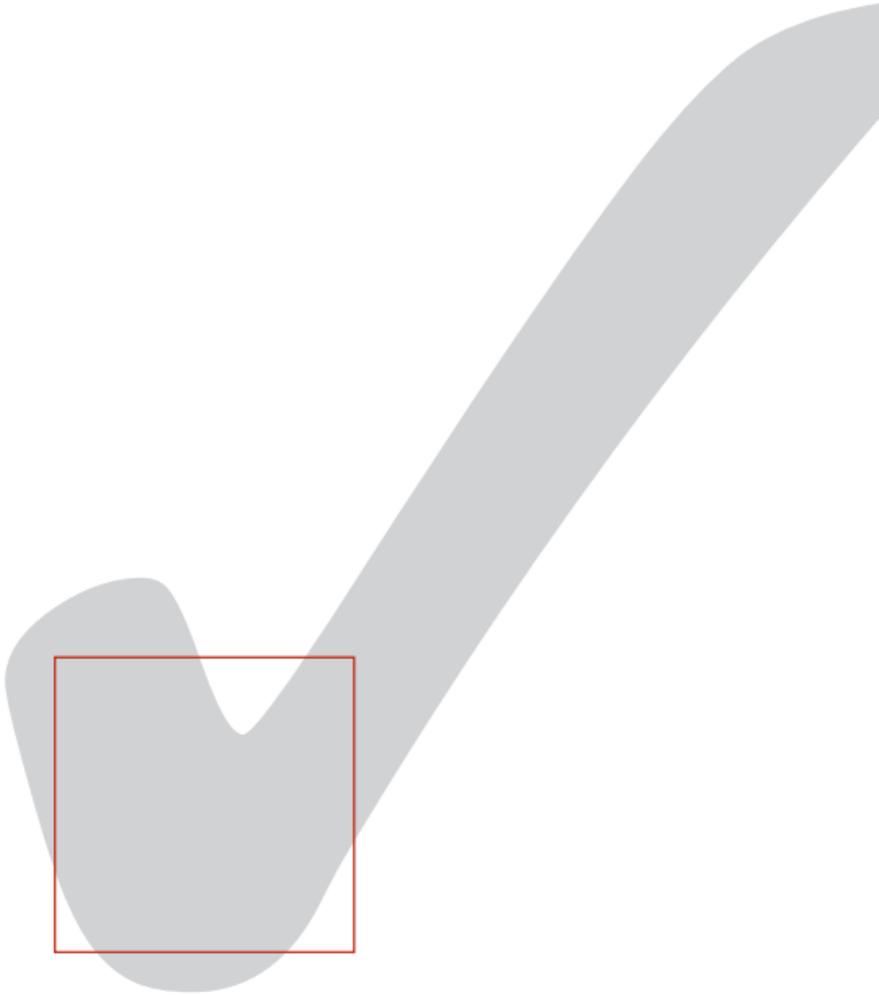
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