Section 409

Chip and Fog Seals

PRECONSTRUCTION:
Obtain from the contractor the supply sources for the chips, blotter material (if needed) and asphalt to be used on the project.

Ensure the results of compatibility tests have been provided and are favorable prior to beginning operations.

EQUIPMENT
The following equipment will be required for inspection purposes:
1. Measuring wheel or DMI
2. Calculator
3. Pan or tarp for calibrating equipment.
4. Documentation Resource
5. Thermometer

INSPECTION
Chip seal involves the placing of a coating of emulsified asphalt on a roadway surface followed by the application of graded aggregate embedded in the asphalt. In some instances, an overshoot of emulsified asphalt is placed on top of the chips.

QA samples for the cover coat aggregate shall be taken and tested before placement begins on aggregates produced on the project for the Chip seal. This ensures that the material meets specifications before it is placed on the roadway. Sampling and testing should be on material taken from the stockpile. If the contractor is using an existing pile supplied by WYDOT, the QA requirements may not apply.

Fog seals are used to seal an open area of surfacing. An emulsified asphalt is applied to the surface at a low rate of application and allowed to cure. Blotter material is used to cover any pooling or other accumulation of the asphalt prior to turning the roadway to traffic.

Placement Equipment Inspection

Power Broom: When it is required to clean the roadway surface, inspect power brooms to be sure that bristles are long enough to accomplish the sweeping task by keeping the bristles in constant contact with the surface. Similarly, when the brooming of chip sealing operations is to be done, inspect for a positive vertical control of the broom head so that only the minimum required downward pressure is used.

Haul Trucks: Haul trucks shall have clean beds and, where necessary to facilitate delivery of the chips to the spreader, have an apron or box extension installed. Inspect “hookup loops or bars” (hitch) for good repair and working condition. Inspect tires for tread design or disrepair that could adversely affect freshly laid chips.
**Aggregate Spreader:** Ascertain the type of spreader that will be used to spread the chips. It shall be a self propelled spreader with positive gate control. Other types or configurations may be used as approved. Inspect gates to determine if positive control for the size of opening is in place and operating.

Inspect scalping screens to ensure the integrity of the screen. Inspect hook-up system for hooking, located on the front of the spreader, onto the trucks that will be dumping into the spreader. Calibrate the spreader with the contractor to determine gate settings.

This is accomplished in the following manner:

1. Measure the surface area in square yards of the pan or a tarp cut to one square yard in area.
2. Weigh the pan or tarp for a net weight.
3. Place on the surface and pass the spreader over it.
4. Once the spreader clears the testing device, keeping all aggregate confined, weigh the device.
5. This weight, converted as needed, to equal a square yard area establishes the rate of spread.
6. Record these results.

This checking process is usually done during the test section operation.

**Distributor:** Establish the overall working condition of the distributor. Inspect snivies on the nozzles for obstruction and determine that all nozzles are aimed the same direction and using the same angle of spray. Establish that the height of the spray bar is sufficient to adequately coat the roadway surface. The calibration of the distributor can be observed during the test strip process.

**Rollers:** Rollers are required for properly “seating” the aggregate into the oil so that when the oil cures the aggregate remains stuck in position. Either a steel wheel or pneumatic roller may be used in accordance with the specifications.

Inspect the tires of the pneumatic roller for smoothness and tire pressure. Inspect coco-mats for cleanliness and contact with tires.

Verify that all pieces of equipment are leak free and in good mechanical condition. When discrepancies with any of the above mentioned area occurs, advise the contractor and make note of the irregularities in the project diary.

**Seal Placement:**
Ensure the surface to be sealed is clean, as specified, prior to the application of the emulsion.

**Weather Conditions:** There is specific weather and seasonal limitations for placing seal coats in the Standard Specifications, Section 409.4.
Ascertain that the contractor is equipped and prepared to handle an unforeseen precipitation event which impacts freshly shot oil and precludes chips sticking. In addition, when the road is in close proximity to established drainage areas, every effort will be made to minimize and mitigate the mixing of asphalt runoff with storm water.

**Test Section (Chip Seals):** The test section is for the contractor to establish the emulsion and aggregate application rate, and to establish the roller type, pattern and number of passes. This information should be used as the guideline to compare the contractor’s operations during placement. If conditions warrant changes to emulsion and/or aggregate rates and roller type, pattern and number of passes, they should be made.

As a general rule the rate of emulsion should be such that approximately half of the aggregate is capable of being embedded into the emulsion. Too little emulsion will not allow the aggregate to stay in place thus affecting the long term performance of the seal. Watch for a slight roll of the emulsion in front of the chips as they are placed. If this does not occur, check the depth of embedment as there may be an inadequate amount of emulsion. Conversely too much emulsion will cause the seal to bleed, reducing the skid resistance of the roadway.

Observe, comment and make notes all aspects of the operation. Do not rely on memory of conversations - record in the project records.

**Application (Chip Seals):** Inspect for contamination or degradation of aggregate as it is loaded into the delivery trucks. Report discrepancies to the contractor which need to be addressed before placement begins.

To help insure a good bond between aggregate and emulsion by eliminating dust it is advisable to pre-wet the aggregate, however, an excess amount of water cannot be allowed to drain out of the truck bed into the spreader or onto the mat - it is detrimental to the performance of the emulsion in sealing and holding the aggregate in place.

Inspect for complete coverage of the emulsion as the spreader passes. Ask the contractor to place aggregate on bare areas and to make adjustments to gates when excessive aggregate is on the road. A spreader with accurate, tight gates and controls will conserve aggregate and produce a uniform spread of material.

Verify that a minimum of 50% of the aggregate is embedded in the emulsion. This is done by poking up a small area of the chip seal and observing how much of the aggregate has evidence of being coated by the emulsion on nearly half of its mass.

If a vibratory steel wheel roller is used the vibrating will be turned off. Inspect closely for aggregate that is fracturing or shattering after the roller pass. If this occurs, advise the contractor so that the situation can be remedied.

Rollers are used to properly seat the aggregate particles in the emulsified asphalt and they are a critical part of the sealing operation.
Rollers shall be operated at a slow speed to prevent the tires or drum from displacing or picking up the aggregate.

The ground contact pressure may be regulated by adjusting the amount of ballast on the pneumatic roller and/or adjusting the tire pressure. Each pass of the roller should overlap the preceding pass by at least one half of the roller width. Rolling should be discontinued when the emulsified asphalt has set or hardened.

Rollers should be kept as close as possible to the aggregate spreader.

Hauling of chip seal aggregate over freshly sealed surfaces should be held to a minimum.

After shooting one side, the lap side should be broomed back 3 to 6 inches (75-150 mm) before starting the other side. The distributor should shoot 3 to 6 inches (75-150 mm) on the lap. The spreader should be extended or opened 6 inches (150 mm) so the lap is covered.

Close cooperation between the contractor and the engineer is necessary for the placing of a fog seal overshoot on top of recently completed chips seals. Weather conditions shall not only be ascertained, but provisions for keeping traffic off of the seal until it cures must be adhered to.

Do not allow the return of traffic to freshly chip sealed areas until loose excess rock has been swept from the road.

Remain aware of ineffective brooming, lack of traffic control and adverse weather conditions and how they are impacting not only the seal but traffic as well. Notes pertaining to these events shall be recorded in the project records.

**Testing/Acceptance:** The contractor will sample, test and provide results as specified. As required, be present when samples are taken.

Accept asphalt, chips, and blotter material as specified, implementing pay adjustments as specified.

**DOCUMENTATION**
Record in a source document the measurements of the day's work to the nearest specified units of measure. Document any calibration procedures, test sections or other adjustments as they occur.

Collect Form E-58 from the contractor for each day and place in project file.

Receive a bill of lading and C.O.C. with each load of asphalt delivered to the project. Sampling will be in accordance with specifications and the Materials Testing manual. Quantities received for pay will be documented on Form E-120J.

The pay quantities will be entered daily into the electronic records for the project. The associated E-120J should be referenced as a placement comment.
Adjustments in pay may be made in accordance with the specifications and as documented on Form E-120J.

Adjustments will be entered as a price adjustment in the electronic records for each placement. The E-120J which shows the adjustment computation should be referenced as a placement comment.

SAFETY
Use the following safety equipment:
1. Hard hat and vest
2. Safety glasses and hearing protection as needed.

Since most sealing operations are done under traffic, the inspector must remain alert to the presence of traffic.

When oil transfers between tankers and distributors are taking place, do not remain in close proximity to the hose and tanks involved in the transfer.