

Seal Coat BMP

Seal coating asphalt pavement is widely accepted and is considered a very effective maintenance activity for the preservation of good asphalt surfaces. Choosing the right sections of pavement is where it all begins.

PROJECT SELECTION

It is recommended that a seal coat application be applied to pavements that meet the following criteria:

- PASER rating of 5 or better
- Cross culverts inspected and replaced as necessary
- Recently crackfilled (12months or less)
- Failed pavement areas have been excavated and base patched
- Minor ruts or depressions have been wedged with hot mix asphalt (HMA)
- Gravel shoulders have been recently graded to standards

MATERIAL SELECTION/DESIGN

The project specifications require a “design” that will combine an “oil” and “aggregate” that are compatible with each other and meet the requirements of the material specifications for Performance Based Maintenance (PBM) Projects. This combination is critical to the success of these projects. Oil adhesion and chip retention are key.

It is recommended that county staff submit a representative sample of their proposed aggregate to their chosen oil supplier to test for gradation and compatibility with the oil being applied. This testing process should also generate a recommended application rate range of the oil and the aggregate based on these tests.

Furthermore, it is required in the PBM specifications that counties submit a representative aggregate sample to WiDOT. A design detailing the proposed oil and aggregate application rates shall be submitted to WiDOT with this aggregate sample.

It is also recommended that the County, vendor, and WiDOT inspector establish an agreement on materials and application rates before the project is bid.

It is understood that aggregate type and availability varies greatly across the state. History of past performance of oil/aggregate applications in the county bidding the project may be the best resource for analyzing a proposed design.

SURFACE PREPARATION

The entire pavement area to be sealed must be scraped/swept free of all vegetation, dirt, dust and debris. The surface must be dry and checked for any foreign material contamination that may prevent the oil/aggregate mixture from bonding to the pavement.

APPLICATION/PRODUCTION

There are many facets to a successful seal coat project. Identifying them and estimating the total cost of this operation requires recognizing the controlling production factor and balancing the labor and equipment to achieve and maintain this controlling rate.

Typically the application capability of the oil vendor is the controlling factor for daily production. Crew size, number of trucks, rollers, and brooms should be established based on this daily oil application rate.

Depending on the haul distance from the aggregate source to the project site, it may be beneficial to pre-haul and stockpile the aggregate in advance. This will greatly reduce the number of trucks required for application. It will also ensure the oil applicator and chip spreader are continuously moving with a steady supply of aggregate. It is important to not contaminate the material when loading trucks with the stockpiled material. Contamination (i.e. sod or topsoil) can clog up the chip spreader and cause delays. Stockpiling material on a paved surface and inspecting inside the truck boxes prior to handling aggregate are essential to maintaining clean material.

Oil/aggregate application rates are very important both short-term and long-term. There are too many variables involved to dictate a specific rate for either material. Experience and test patterns are the best methods for setting these rates. Application rates may require adjustment periodically throughout the day as temperature, humidity, and porosity of pavement or other conditions change.

Much of the success and safety of these projects is based on the aggregate size and application rate. Simply said, smaller gradation causes less damage to resident's vehicles. The less material applied, the less loose material causing damage and less sweeping required. Small scale test patterns are recommended immediately prior to application to establish actual daily application rates.

COMPACTION

Rolling aggregate timely is very important in establishing long-term aggregate retention and an acceptable new surface. The major mode of early seal coat failure is loss of aggregate. The PBM specifications address timing and equipment requirements and should be complied with. The rolling operation is the tool in the seal coat train that ensures that proper embedment is achieved. A minimum of two (ideally three) rollers are required. The rollers should be staggered across the travel lane. To maximize embedment, the initial roll of the aggregate should occur before the emulsion “breaks” or turns from brown in color to black. Likewise, the aggregate trucks should stagger themselves as they wait to “dock” with the chip spreader. The staggering of the aggregate trucks provides another round of compaction.

If alternative equipment/methods are to be considered, they should be addressed in the supplemental special provisions section of the PBM Agreement. A signed/written agreement accepting this equipment/method should be submitted with the bidding documents.

SIGNAGE

It is recommended that advanced notices be published in area newspapers and on department websites. Alerting the public to these operations one to two weeks in advance citing specific sections of highway is helpful. This will encourage drivers to choose alternate routes or plan additional time if they plan to use these sections of Highway. Where practical, programmable message boards can be used to notify drivers one to two weeks in advance of this work on a specific section of highway. On lower volume highways, signs stating “Seal Coating Next Week” can be placed a week in advance to alert drivers.

Additional signage is recommended at the limits of the project and at all crossroad intersections when the project starts. These signs typically read: Fresh Oil, Loose Gravel, No center Stripe with an advisory 35 MPH plaque. Please refer to the attached photograph/example for reference.

TRAFFIC MARKING

Temporary Raised Pavement Markers (or TRPM’s) are required and should be installed in accordance with the PBM specifications and the standard detail drawing.

Properly installed TRPM’s can be used as reference for the beginning and end points of no passing zones. It is recommended that these reference points be collected and saved with GPS Equipment or marked with offset stakes in the slope area as a second reference point for the new marking process.

In compliance with the PBM specifications, permanent markings are required within 14 days of the seal coat application. It is recommended to sweep excess aggregate from the pavement and apply permanent markings as soon as possible. Five to seven days is optimum.

TRPM's will eventually wear off or get plowed off and will be found on the shoulder slope or in the ditch area. It is highly recommended that Counties make it a priority to assign a crew to collect these TRPM's early the following spring season to minimize the potential environmental risks that could be associated with these markers.

TRAFFIC CONTROL

Driver awareness is critical to a successful seal coat operation. Maintaining safe speeds of through traffic at all times is critical for crew safety and vehicle damage claims.

Handling traffic during the oil and aggregate application process can be handled in several different ways based on anticipated traffic volumes.

Typically on low volume (<2500 ADT) highways a rolling closure utilizing flaggers is an acceptable method for maintaining safety during a seal coat process. On medium volume (2500-3500 ADT) highways the use of pilot cars to control the speed and access of traffic during the installation process should be considered.

Pilot cars are required for PBM seal coat projects on State highways with an ADT >3500.

Traffic control measures such as flaggers or pilot cars should remain active until the project is stable and loose aggregate is minimized to an acceptable level. Several variables to consider when assessing the project and deciding when to allow unrestricted traffic are: ambient temperature, humidity, oil set rate and aggregate retention.

Road Closure is also an option to consider if there is a reasonable detour alternative or if the highway will be closed for other types of maintenance at the same time i.e. bridge work etc.

SWEEPING

The amount of sweeping required and the timing to remove excess aggregate from the pavement is directly related to the aggregate application rate.

There are many different approaches to providing a safe and functional seal coat project after the aggregate is applied. The goal is to provide a new driving surface free of loose aggregate as soon as possible minimizing the potential for dust, vehicle damage claims and vehicle control issues. Some agencies prefer to sweep the same day they apply aggregates, others do a light sweep of the heavy areas on application day and perform final sweeping 2-4 days after application depending on weather conditions and traffic volume. It may be necessary to use a water truck to apply water to the surface prior to sweeping on subsequent days to minimize dust.

All sweeping should be accomplished with a unit that will allow down pressure adjustments. Minimum down pressure should be used to remove excess aggregate without marring the new seal coat surface.

It is important to determine that the oil has completely cured and set to maximize chip retention prior to final sweeping. Test sweeping with medium down pressure should allow loose aggregate to be swept to the shoulder without marring the newly sealed surface. Crews may need to pick up aggregate from curb sections and near residential lawn areas and storm drains.

It is recommended that the proposed sweeping schedule and equipment being proposed is described in detail in the agreement at time your proposal/bid is submitted.

“Fog” sealing is also an option. Many agencies feel this is an effective method of securing aggregates to the new seal and maximizing the life of the new system. Any “Fog” seal or other additional treatment being proposed should be defined in detail at time of submittal as well.

Please refer to the attached matrix for some information on equipment options, crew sizes, application ranges, and material options currently being used by Counties in their seal coat operations.

CHIP SEAL SURVEY RESULTS	Oil Specified	Oil Application Rate	Chip Material Used	Application Rate	Chip Gradation specification	Vary by Roadway?	Who hauls chips	Chip Oil Compatability Test	Who does testing	Oil applied/ Distributor	Own chip spreader	do you close road	Full width or one lane	Rollers -Type & how many	Brooms	Who installs marking tabs	Tabs removed when marking complete	Who removes them	Who does traffic marking	Chip Seal Highways	Fog Sealer	
Adams	CRS2-P	35- 38	Fractured granite	18-22 #/sy	1/4" or 3/8" fractured	No	County	Meigs	Meigs	Applied	yes	Yes/No	Full		4	County	No	County	County	Yes	Fog Seal last year	
Buffalo	CRS-2		0.34 1/4" Fractured granite	Not Sure	Wisc DOT specs	No	Vendor	No		Both	Hire another county	No	One Lane	2 rubber	1 Self-Propelled	N/A	N/A	N/A	N/A	Yes	Gee Asphalt	
Burnett	CRS-2 & CRS-2P	36/gal	Crushed fieldstone	20-22 lbs/sy	MnDOT FA-2 or FA 2 1/2	No	County/local trucking	Yes - Meigs	Contractor	Applied	yes	No	One lane	Rubber/3	3-State/2-County	County	yes	County	Contractor/County	Yes-each 7 yrs	On state highways but not county roads	
Chippewa	CRS-2	39 -3/8 .32 5/16	3/8" & 5/16" minus	160-180 t per mile	3/8" & 5/16" Minus	No	County	Yes - Meigs	Meigs	Bid Out	yes	No	One lane	1 rubber&1 steel drum	1 8' mounted on truck	County	Not usually	Taylor county	20-30 m per yr	BPM Projects over chip seal		
Columbia	HFRS II	32- 36	Power plant ash/granite	18-20	5/16"	No	County	Yes	Meigs	Applied	Hire another county	No	Depends on volume	2 6' Pneumatic rubber	2-8'	County	No	County	County	Yes	Fog Seal	
Dane	HFRS-2P OR CRS-2P	0.36 gal/SY	Gravel,Granite, Slag	Granite-26#/sy Slag-19#/sy		No	County	Yes	Oil Contractor	Applied by supplier	yes	no	one lane	11 Ton Pneumatic roller	8' Self-propelled	County	No	County	County	Yes		
Dodge	HFRS-2 asphalt emulsion	38 gal/sy	Limestone 60% fractured	20-25 lbs/sy	WISDOT Section 475.2	No	County	Yes	Oil Contractor	Applied	Hire another county	No	One Lane	2 Pneumatic	2 Self-Propelled	County	Yes	Plow or traffic	County	Yes	Fog Seal	
Door	HFRS-2 OR HFRS-2P	.04 gal	Limestone	23 # s/y		No	County	No	Oil Contractor	Applied	Hire another county	yes	full width	1 rubber&1 steel drum		3-Jan	County	County	County	Yes	No	
Dunn	CRS-2 & CRS-2P	037/gal/sf+/- .005 gal/sf	Washed river rock or crushed gravel chip	2.9#/sf	WISDOT gradation	No	County	No		Applied	Yes	No	One Lane	2 6+ ton pneumatic		2	N/A	N/A	N/A	Contractor	Yes	GSB-88
Green	90% HFRS-2 & others	37 - 41	Limestone & Pea Gravel	22 to 30 lbs/sq yd		No	County	Yes	Meigs	Distributor	Yes	No	One Lane	2 Pneumatic 10-12 ton	1 Self-Propelled	County	No	Contractor	Contractor	Yes	Fog Seal & GSB88 Gee Asphalt	
Green Lake	CRS-2 & CRS-2P	38 gal/sy County	Crushed sandpit chip	18-20 lbs/sy	3/8" fractured washed chips	No	County	yes	Oil Contractor	Applied	yes	Yes	Full-county/One state		3	1	County	No	Another county	Yes	Fog Seal	
HFRS-2 HFRS-2P		36 gal/sy State																				
Iowa	CRS-2 & CRS-2P	32 to .45 gal/sy	Limestone & Pea Gravel	22 - 28 lbs/sy	State Spec	Yes	County	Yes	Meigs	Applied	Yes	No	12 Feet	2-Pneumatic rubber		2	County	No	County	Yes		
HFRS-2 HFRS-2P						County vs State																
Jefferson	HFRS-2	35 gal/sy	Limestone/Granite	25#/sy	3/8"	No	Another County	Yes	Meigs	Applied	Yes	No	One lane	1-2		1	County	No	Another county	Yes	Yes-last year	
LaCrosse	CRS-2P		0.38 Granite	20 #/sy	1-4 x 1-8 washed granite	No	County	No		Distributor	Yes	No	Depends on rd & traffic	2 rubber/1steel	8" broom or st sweeper							
Lincoln	CRS-2 & CRS-2P	32- 38	5/16" Minus Stone	75 sy/ton	5/16"	No	County	Yes	Meigs	Applied	Hire another county	Sometimes	Full width	2 rubber tire	2 brooms	County	No	Another County	Yes	GSB-88 and Onyx -test patches		
Manitowoc	HFRS-2P	36- 38 gal/sy	Limestone	22lbs/sy	1/4"	No	County	Yes	DOT oil Supplier Lab	Applied	Hire another county	No	One Lane	Pneumatic Tire X 2	15" & Camelback	County	No	Another county	Yes	No		
Marathon	CRS-2P & CSS-1H (fog)	0.34 chips/ .08-1 fog	Granite	20 #/sy		No	Contractor	No		Applied	Contractor	No	Full	Varies/Contactor	Varies/Contactor	Contractor	No	Contractor	Contractor	Yes	CSS-1H fog seal	
Marquette	CRS-2 & CRS-2P		0.38 Boiler Slag & Granite	19-20	3/8 chip	No	County	Yes	Meigs	Applied	Hire another county	Yes	Full width	3 Pneumatic Tire		2	County	No	Another county	Yes	Fog Seal	
Oconto	HFRS-2P	35 gal/sy	Limestone	26-27 lbs/sy	State Spec	No	County	No		Applied	Hire another county	Depends	Depends on type of road	2 Class 532 rubber		2	County	Yes	County	Yes	No	
Polk	CRS2 & CRS2P	3-0 to 4.3	Granite & Trap Rock	21 to 24 lbs per square	FA2 & FA2.5 MN Spec	Yes	County	No		Applied	Yes	No	One Lane	2-9 wheel Rubber	Superior Power Broom	County	No	Contractor	Contractor	Yes	Fog Seal	
Pierce	CRS-2	30- 38	Pea or coal slag	18-22 lbs/sy	FA-2	No	County	No		Applied	yes	No	One Lane	2 Self-Propelled Rubber		County	No	Contractor	Contractor	Yes	No	
Portage	CRS-2	40 gal/s/y	Natural stone	Ave 28 lb/sy	3/8" chips	No	County	No		Applied	Hire another county	No	Depends on volume	3-12 Ton	2 Self-Propelled	N/A				Yes	Fog Seal	
Pepin	CRS-2 & CRS-2P	31 - .35 per s/y	Granite	21# per sy		No	County	Yes	Meigs	Applied	Yes	No	Town-full/County/One	Self-Propelled Rubber	1-8' Self-Propelled	County	No	Another County	Yes	No		
Richland	HFRS-2	3/8 chip .38	Slag, Limestone & Granite	120 yds-22 ft surface	Do not specify	Yes	County	No		Applied	Hire another county	No	One Lane	2-9 wheel Rubber	2-8' Hydraulic driven	County	No	Another County	Yes	Fog Seal		
		5/16 or 1/4 .30-.34																				
Sauk	HFRS-2, CRS-0, CRS-2P	365 gal/sy	Limestone & Granite	20 lbs per s/y	3/8 inch	No	County	No		Applied	Hire another county	Yes	One Lane	2-3 ton Rubber	8" tractor mounted	County	No	Another County	Yes	No		
Shawano	HFRS-2P	38 gal/sy	Fractured Pit Run	22 lbs/yd2	DOT Standard Spec	No	County	Yes	Oil Contractor	Applied	Yes	Depends on conditions	One lane	2 Rubber Tire Rollers	Mounted 12' broom	County	No	County	Limited Basis	CRS-2P Fog Emulsion		
Sheboygan	Polymer HFRS	34 or 32	Limestone	24 lbs s/y	100% pass 3/8", #4 sieve 1-17%	No	County	Yes	Meigs	Applied	Yes	No	One Lane	2 Hyster CS30A Rollers	1 Broom & Sweepers	County	No	County	Yes	Fog Seal & Onyx		
Taylor	HSRF-2	35 or 36	Granite	170 ton/mile	Washed 3/8	No	County	We have	Meigs	Applied	Yes	County-no Town-yes	One lane	2 Self-Propelled Rubber	10 ft Mounted	County	No	County	County	GSB		

LOOSE
GRAVEL

35
M.P.H.

FRESH
OIL

05/11/2017 11:40



CHIP
SEALING
STARTS NEXT
WEEK

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