Extending Pavement Life with Slurry Seal

Mill, pave, watch the road deteriorate, wait a couple years longer, and when the complaints hit a cacophony, mill it and pave again. Rinse and repeat. Surely, there must be a better way.

Well, you know there is. There is an entire pavement preservation toolbox at your disposal that lets you intervene at the earliest signs of pavement distresses and ward off their proliferation, extending the service life at a fraction of the cost of traditional mill/pave/deteriorate/repeat.

We had opportunity to catch up with this year's slurry seal operations and put together a video on our Delaware T2/LTAP YouTube channel. We hoped to show at least many of the best practices that can lead to a high quality treatment for roads that are early in their distress cycle.

For pavements still in good condition, slurry seal can be used alone or in conjunction with other treatments to extend the pavement life by 5-7 years, and restore some of the skid resistance of the original asphalt overlay, all at a discount to milling and overlay that will be prematurely necessary otherwise. It is a surface treatment designed to restrict moisture intrusion, protecting the structure from further oxidation and raveling, and restoring a uniform black appearance.

Slurry seal is a mixture of asphalt emulsion (sometimes polymer-modified), mineral aggregate, water, and additives. It is precisely proportioned, mixed onsite in a special truck-mounted rig, and uniformly spread over a properly prepared surface at a single stone thickness. As a homogenous mat with good bonding properties, it adheres firmly to a properly prepared surface. It can be applied rather quickly, allowing traffic soon after the emulsion "breaks," causing reasonably limited disruption to the traveling public.

As with other pavement preservation technologies, selecting the right road for slurry seal is key to its success. Alligator cracking can be indicative of failed subgrade or inadequate subsurface drainage and these roads are poor candidates. Surface rutting greater than ¼" deep is also a red flag. Roadways with environmental cracks are fine as long as those greater than ⅛" are sealed. Special attention should be given if the surface shows flushing or bleeding; these can often still be suitable candidates, but they may require some careful modifications to the mix design.

Like any pavement application, good surface preparation is essential for the optimal service life extension of slurry seal. The surface must be broomed or swept to remove all free material and oil and grease should be limited or it will need to be addressed. If you have underground utilities like sanitary sewers or water mains, the manholes and valve covers must be masked off temporarily (with kraft paper, tape, or other means) so that access to them can be restored.

Slurry seal can be placed at 40°F and rising, so it is rather forgiving if you get behind in your preparation work and need to push it into October. However, the closer you push to 40°F, the longer you will have to keep traffic off the treated area. Because the binder is an emulsion (water and asphaltic bitumen temporarily bonded together with a surfactant), the slurry goes down as a chocolate brown material and in time, the emulsion "breaks" (in reference to the weak water/oil bonds breaking down), the water usually evaporates, and the surface turns jet black. In August, this can happen very quickly, but in October under cloudy skies, this can drag on. Indeed, the released water may not evaporate; it may sit at the surface if it cannot run off naturally. Warm, breezy days with low humidity are ideal. Rain or wet surface conditions are a non-starter.

So, plan your traffic management operations accordingly. Trained flaggers are an essential part of controlling access to the treated areas while they cure and they may have to do a bit of walking up and down the area to deal with adjoining residents who want to prematurely back out of their driveway.

The final surface of slurry seal needn't be particularly pretty to be functionally effective, as long as good coverage is achieved and no ridges are left that can trap water at the surface. However, a thoughtful application that results in a smooth surface will be more appealing to residents of the neighborhood and will go a long way towards them accepting the product aesthetically. Translation: greater acceptance = less complaints = less meetings = being left alone to do your job.

Have a look at our video to see if slurry seal should be part of your pavement preservation toolbox. If you are unsure, the Delaware T^2/LTAP Center's Municipal Engineering Circuit Rider is intended to provide technical assistance and training to local agencies. So if you have pavement management questions or other transportation issues, contact Matt Carter at matheu@udel.edu or (302) 831-7236.