

The Philosophy of PAVEMENT

As their budgets get tighter, pavement owners are looking for cost-effective ways to use their dollars. Pavement preservation offers a ready solution and one that can put dollars back in the budget.

“Pavement preservation pays,” says Jim Sorenson, Director of Pavement Preservation for FHWA. “It pays because it extends service life and that saves dollars.”

“In the past, most agencies have used a ‘reactive maintenance’ program,” says Sorenson. “For the last 25 years, our roads have been managed by programs that waited for roads to need repair before they got fixed. These programs taught our highway agencies to fix the road when it was broke—but usually not before. Pavement preservation teaches us to fix it before it’s broke.”

Many Advantages

“We know from our data that we get close to a 10 to 1 return on dollars spent for pavement preservation,” says Sorenson. “That means if I do some minor investing—about 10 percent of my road budget—for pavement preservation, I’ll eventually have the dollars to catch up on the \$50 billion backup in road needs around the country.”

Sorenson says that pavement preservation has other advantages too. “You can get in and out quick,” he says. “That means the user doesn’t suffer. Using a thin surface treatment, you can return the road to

use in the same day, sometimes in as little as one hour. Compare that to the standard maintenance mill-and-fill procedure. A mill-and-fill project will usually take from one week to one month. A thin surface treatment can return the road to service in the same day.”

Many Options

But agencies that use pavement preservation techniques say that selecting the right treatment at the right time isn’t easy. There are many preservation treatments to choose from and no clear standard for when to apply them. “You have to pick the right one for the project,” says Sorenson. “For example, if you are in an area where there are a lot of freeze-thaw cycles, you can use a rubberized chip seal or thin overlay or microsurfacing to preserve the pavement. Or even a light fog seal or light chip seal may be the answer.”

But many times there is no easy answer. Only agencies that have a good, working pavement management system (PMS) and a number of years experience with pavement maintenance treatments have the data to identify the most cost-effective treatments and when to use them.

Choosing Candidate Pavements

The best candidates are pavements that are in fair to good condition with little or no structural, load-related distress. Pavements with distress that affect only the layers closest to the surface—conditions



Western Emulsions

Applying a seal coat before the pavement experiences further deterioration.



Western Emulsions

Thin surface treatments quickly allow traffic to use the pavement. Microsurfacing Washington Street in downtown Phoenix.

such as cracking, raveling and porosity—are the best candidates. Structural damage, such as fatigue cracking and rutting, usually requires rehabilitation.

“The right way to fix a road is to understand how to properly maintain the pavement so it will reach its maximum longevity, using a PMS system to show the true condition of the pavement,” says Bill Ballou, president of the Foundation for Pavement Preservation in Okemos, Mich. “The wrong way is the old way—waiting until the road needs repair before you fix it.”

“We’ve used pavement preservation for many years, but few if any agencies have documented the success or failure of those practices to prove

PRESERVATION

by John Davis and Dwight Walker



McAsphalt Industries

Constructing a chip seal.

that they lasted or didn't last. We finally realized that we didn't have enough documentation to prove that pavement preservation lasts.

"Then we realized if we used special equipment to document the road's condition regularly, we would know the right time to do a pavement preservation treatment. That special equipment includes videos in vans and video equipment tied to computers that evaluate the pavements."

The Best Techniques

"There is no single best method," says Ballou. "It all boils down to pavement selection and pavement condition. What does the pavement look like now and how often has it been maintained? What is its rate of deterioration? Is it going to be a high volume road?

Will it carry a lot of heavy traffic? What kind of climate is it in? Is noise a factor? For example if you were in a highly residential area and noise was a factor, you wouldn't want to use a chip seal."

Ballou says the increase in surface treatments doesn't mean we won't recycle. "Surface treatments are increasing, but I think we'll also see a proliferation of recycling as well," says Ballou. "Recycling is an environmental plus. But we still need a good surface for traffic to ride on.

"I think what we are going to see is a move toward the European practice of constructing a super-strong base course, a good riding surface, then periodic surface treatments. That kind of pavement is going to last longer. Our purpose at the Foundation for Pavement Preservation is to teach

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people to use a variety of surface treatments. But it still depends on what you know about the road. If you really analyze the pavement, you'll make a proper selection.

"The most important thing is learning to manage the pavement. And to know what the costs are. We can't begin to manage until we know what the costs are. Pavement management boils down to using a planned approach—not a reactive approach. In order to do that, we need some kind of PMS to properly evaluate the pavement. In the past, we've used a cyclic, reactive approach. Now we know we have to evaluate the pavement," concludes Ballou.

Tremendous Savings

"There is tremendous savings in the pavement preservation approach," says Larry Galehouse, director for the new Center for Pavement Preservation at Michigan State University. "The big savings is not only the money, it's that we are preserving our highway infrastructure."

Galehouse agreed that traditional methods have been to reconstruct or make heavy repairs. "The preservation concept is that we need to maintain what we have, not reconstruct it," says Galehouse. "Why should we go out and find new material to reconstruct a road or build another one when we already have one?"

Galehouse believes it's smarter to maintain what we have and to

extend the life of the road that is already there. “We can extend a road’s life from 25 to 50 years, using what is available,” he says.

Three- to Ten-Year Fix

FHWA’s Sorenson and state agencies concur that the best treatment is the one that most cost-effectively corrects surface distresses. Cost-effectiveness in its most simplified form is annualized cost, or how much the treatment costs divided by how long it will last.

“For example, we know that a new asphalt surface will last between six and 16 years,” says Sorenson. “If I do pavement preservation at the end of seven years, I’m going to extend the life of that road significantly.”

Sorenson says that a proper pavement preservation treatment will usually provide a 3- to 10-year fix. “We used to think we could get 3 to 5 years, but our data shows we’re getting 3 to 10 years. Even on primary roads with high volume traffic and on rural interstates, you can get an 8- to 12-year fix with a proper chip seal. Our studies show that the success of a thin surface treatment is not dependent on traffic volume. It’s dependent on traffic control and choosing the right treatment option.”

Education, Outreach and Research

Larry Galehouse says his Center at Michigan State has three primary purposes—education, outreach and research: *education*—because pavement preservation means a different way of thinking; *outreach*—working with local county and city agencies to show them the benefits and the



Koch Pavement Solutions

Constructing a thin, bonded overlay.

“how to” of pavement preservation; *research*—both basic and applied, as well as extensive data collection

“Our purpose is to communicate the ‘why’ and ‘how to’ of pavement preservation,” says Galehouse.

“We’ll work with county engineers through the county road associations. But we’ll also educate agencies as to what is the most effective technique for their particular county. We’re finding that most counties want the biggest bang for their buck. This comes through training and education as to what works best for them—crack sealing, slurry seals, chip seals, microsurfacing or thin overlays.”

New Frontier

“We also have to look at deterioration and the rate of deterioration. No two roads are exactly alike. Some roads at the end of 20 years are worn out; some are good for another 20 years. A 10-year-old road in Kentucky is different than one in Michigan or Mississippi or Arizona. The rate of deterioration will dictate the treatment.

“What we are really experiencing is a new engineering frontier. We

have so little data about pavement preservation that in a way we are looking at a new frontier. Good maintenance is always more complicated than new construction.”

It’s About Economics

“Finally, I’ll say that pavement preservation is all about economics,” Galehouse concludes. “Can the county or state afford it? It takes a lot of work to field an effective preservation program. To be effective, an agency has to undertake new initiatives, and it has to be a smart shopper, able to make a wise investment.

“Many small agencies need to expand the capacity of their roads. For example, some agencies need to expand a road from two to four lanes or from four to six lanes. The question they are asking is, ‘How do we pay for it?’ Our answer is to use a proactive approach. Use pavement preservation to maintain your system so you can add those lanes to the road that needs them. It’s all about investment and economics.” ▲

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Pavement preservation is all about economics.