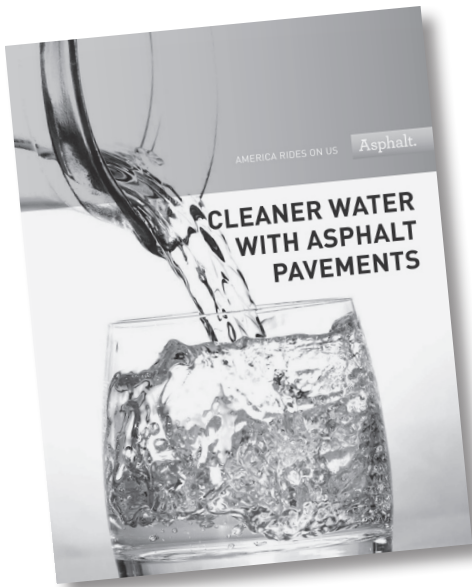




CENTERLINE

EDUCATION



For All the Right Reasons, Asphalt is the Green Pavement of Choice

THE ASPHALT PAVEMENT Alliance recently released a white paper titled “Cleaner Water with Asphalt Pavements” by **Dr. Howard Marks**. The publication documents the beneficial effects asphalt pavements can have on water quality, citing the results of scientific study and experimentation. It focuses on three main areas of contribution.

• Protecting Water Supplies

Asphalt pavement is used as a lining material in reservoirs and industrial detention ponds – either to preserve clean drinking water or to contain industrial wastewater. In both cases it is important that the contents of the reservoir or pond do not mix with the soil or groundwater at the site.

Two districts in California have been using asphalt pavement linings in their water reservoirs for more than four decades. This technique continues to be the choice for more modern facilities as well, evidenced by a new reservoir under construction in 2011 that calls for a 19-inch-thick asphalt liner.

State fish and wildlife agencies in Oregon and Washington have been using asphalt liners for their fish hatcheries for more than twenty years. The hatcheries provide a safe environment for fish to grow and develop until they are released to rivers and streams at about 18 months of age. The asphalt-lined hatcheries create an environment that managers can precisely control during this delicate stage in the fish lifecycle.

Two districts in California have been using asphalt pavement linings in their water reservoirs for more than four decades

Products derived from asphalt binders are also used to line the pipes that supply our drinking water.

Beyond protecting clean water, as detailed above, asphalt pavement is also employed to contain wastewater, preventing contaminants from infiltrating the soil. Asphalt pavements have been used

to line industrial retention ponds, for example, and have also been used to line and/or cap industrial waste sites.

• Treating Stormwater Runoff

Research cited in this paper shows that asphalt-paved roadways do not contribute to the pollutants found in stormwater runoff. In some cases, certain asphalt paving methods can actually improve the quality of the runoff.

The Marine Science Institute analyzed pavement runoff in a 1997 study titled “Impact of Runoff from Asphaltic Products on Stream Communities in California.” The study concluded that the pollutants present in stormwater runoff from asphalt pavements were by-products of vehicle emissions, crankcase oil drippings and industrial operations. They were not derived from the pavements themselves. The Institute found no polycyclic aromatic hydrocarbons (PAHs) – common pollutants monitored by the Environmental Protection Agency (EPA) – in the pavement stormwater runoff. The study also determined there to

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Asphalt, the Green Pavement of Choice – Continued

be no difference in heavy-metal concentrations downstream of the runoff site compared to upstream.

Open-graded friction course (OGFC) pavements have been shown to actually reduce the pollutants in pavement stormwater runoff. This type of pavement has a high level of interconnected voids that allow water to permeate the pavement until it encounters an impermeable underlying layer that drains the water laterally to the pavement edge.

The Texas Department of Transportation conducted a study that compared OGFC pavements to conventional pavements, and the results show that pollutants present in runoff may be reduced by up to 90 percent with an OGFC pavement. The drainage that this pavement provides – with its high percentage of voids – also contributes to a reduction in splash and spray. This

promotes improved visibility for drivers during inclement weather. Some state transportation agencies even report a reduction in the number of vehicle accidents at locations where OGFC pavements have been introduced.

Full-depth porous asphalt pavements go even further to filter pollutants from stormwater – so much so that the EPA recognizes full-depth porous pavements as a “best practice” for stormwater management.

With a full-depth porous pavement, the water drains through the entire depth of the pavement and slowly filters into a stone recharge bed, and then into the soil beneath it. This type of pavement can reduce or even eliminate the need for other stormwater management structures, and is successful in mitigating vehicle metals and oil drippings. Villanova University found reductions of PAH in

stormwater runoff from full-depth porous pavements even when oil was added to the system. The University of New Hampshire conducted a similar evaluation, and found a reduction of more than 90 percent in total suspended solids, total petroleum hydrocarbons, and zinc.

Porous pavements, once applied primarily in parking lots, are making their way to roadways, driveways and walkways across America. Washington State has even investigated using this paving application for the shoulders of heavily traveled roads. Initial tests of this application in Washington showed a reduction of almost 90 percent in stormwater runoff and pollutant loads.

• Does Not Leach into Soils

Contrary to assumption or belief, neither asphalt pavement nor reclaimed asphalt

pavement (RAP) leaches petroleum. A number of studies, carried out in accordance with EPA leaching methods, produced none of the PAH pollutants the studies were designed to measure.

Asphalt pavements are 100 percent recyclable, and leave a smaller carbon footprint than other paving materials. Smooth asphalt pavements go even further, saving automobile fuel and reducing vehicle wear and tear.

Beyond these attributes, asphalt pavement contributes to a cleaner environment, providing improved stormwater management, ensuring clean water supplies, and reducing roadside pollution. It truly is a clean, green paving material. ▲

You can download a free copy of “Cleaner Water with Asphalt Pavements” at the Asphalt Pavement Alliance website, www.asphaltroads.org (News tab).

Contractor Proposes Thin-Lift Overlay for Busy Corvallis Street

NORTH SANTIAM PAVING COMPANY RECENTLY COMPLETED A THIN-LIFT overlay project for the City of Corvallis. The job was originally specified as a chip seal, and included micro milling to remove a failed slurry seal. However, after discussions with the City regarding potential performance and constructability problems with the chip seal the City agreed to convert the specification to a thin-lift overlay.

“The original project called for a one-inch micro mill, and a one-shot, half-inch chip seal,” said **Pete Sipos** of North Santiam Paving Company. “We proposed a one-inch standard mill with a one-inch overlay of 3/8-inch dense, hot mix asphalt concrete,” Pete explained. “We felt the overlay would provide a far superior product in terms of ride quality and structural capacity. We were also very concerned about chip loss and potential windshield damage from chips as this is a very high traffic urban street.”

The City continued with the micro mill, but did opt for the thin-lift overlay as proposed. The cost for the paving portion of the project was about 33 percent higher for the thin-lift option compared to the



original specification, but the difference was much smaller when evaluated as a component of the entire project, and the asphalt overlay is expected to last significantly longer than a chip seal.

“The thin-lift overlay construction provided additional depth of strength, improved ride quality, and less road noise,” Sipos said. “And the public perception is that we actually improved the road rather than just sealing it,” he added.

The Asphalt Pavement Association of Oregon, Inc., (APO) is dedicated to promoting the use of asphalt concrete by developing customer driven programs to enhance quality and excellence in all aspects of asphalt technology. We believe that the key to growth and prosperity in the industry is continuous quality improvement obtained through active association membership, positive customer relationships, education, and training.

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CENTERLINE is published four times a year by:
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Porous Pavements Evolve Beyond Parking Lot Applications with “Two Layer” System

OVER THE PAST DECADE, POROUS pavements – traditionally a popular choice for light duty parking lots – are proving beneficial in road and other heavier duty paving applications for their stormwater management capabilities.

The original concept of porous pavement dates to the 1970s, when the Environmental Protection Agency engaged the Franklin Institute to explore and develop the concept. Today, those original designs are being modified to accommodate more traffic and heavier loads, as well as to facilitate long-term maintenance of the surface layer and underlying drainage structure.

Like today's porous pavements, original porous pavement designs typically included an aggregate “reservoir” base course. This reservoir layer contained large voids where stormwater could collect as it slowly filtered into the ground at a rate the soil could absorb. Initial designs called for the reservoir layer to be topped with a “choker” layer made up of smaller, porous aggregate, and for the choker layer to be paved over with a three-eighths-inch aggregate mix.

The most significant improvement since these first porous pavement designs were introduced is the development of the “two-layer asphalt system.” The two-layer system still has a reservoir base, but instead of topping the reservoir base with a choker layer and single layer of porous asphalt, more modern designs apply an asphalt treated permeable base (ATPB) layer of two to four inches in thickness

course, and cover that with a final lift of porous asphalt.

The ATPB provides many benefits:

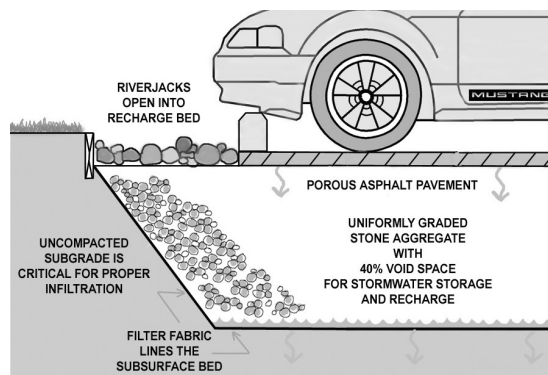
- it eliminates the need for a choker course, which can be expensive to make and can be a difficult surface on which to operate paving equipment;
- its high void content makes it less susceptible to becoming clogged;
- its three-quarter-inch stone nests well with the larger stone comprising the reservoir base;
- it provides excellent structural support for applications with heavy loads;
- it allows staged construction, so equipment can pass over the structure prior to the top lift being placed; and,
- it requires about one-half of the asphalt cement that would be required for a traditional mix design making it a very economical asphalt layer.

The ATPB layer is topped with a final lift of porous asphalt, usually one-and-a-half to two inches thick, and comprised of three-eighths-inch or half-inch aggregate.

This new approach to porous pavement makes it easier to maintain the pavement's permeable qualities because:

- only the top one-and-a-half inches of pavement needs to be vacuumed or flushed;
- any debris that penetrates the surface course (that contains smaller voids) should easily pass through the ATPB and reservoir course (that contains larger voids); and
- if more extensive surface maintenance is required, only the top lift of asphalt would need attention.

The first known installation of significant size of the two-layer porous asphalt system is the Pringle Creek project in Salem, Oregon. The Pringle Creek development utilizes porous asphalt in all of its streets for stormwater management. It was constructed in a staged process in 2007, and has performed exceptionally well ever since. APO published a story on the Pringle Creek project in its Fall 2007 newsletter, which is available by request in PDF format.



Diagram, courtesy of Cahill Associates, illustrates the concept of porous pavement used for a parking lot application



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IN THE FIELD

ODOT Plans Thin-Lift Overlay Test on I-5

A TWO-MILE, TWO-LANE STRETCH of I-5 between Grants Pass and Medford will be treated with a thin-lift overlay next spring. The treatment serves as a preventive maintenance measure, and a means to test an alternate method of treatment to what normally would be addressed with a two-inch mill and fill, or a chip seal on lower volume roads.

This section of road has an open-graded wearing course. The Oregon Department of Transportation (ODOT) treated it with a traditional overlay in the past, but found it susceptible to stripping because the open grade would trap moisture beneath the overlay.

Chip seals might have been considered as well, but not for a road with the traffic volume of I-5. The agency attempted chip seals on similar open-graded wearing courses on I-84 with some

success, but wasn't comfortable going that route in this case.

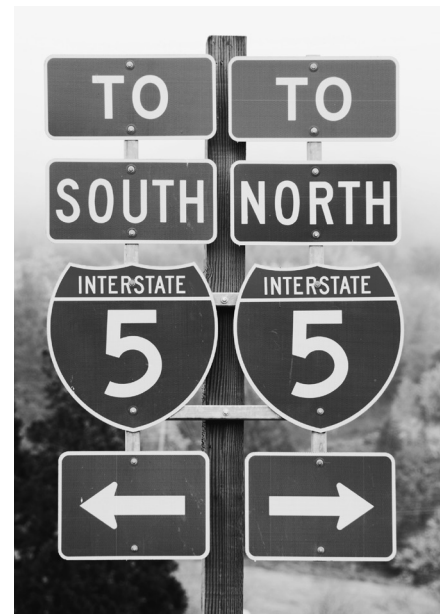
"The thin lift will provide additional benefits to a chip seal, and the comparative costs will be closer than a typical mill and fill," said **Jeff Shambaugh**, ODOT pavement specialist.

The Asphalt Pavement Association of Oregon is assisting with the mix design for the thin-lift overlay, which will include a 3/8-inch dense-graded mix and test of a new polymer-modified binder. ODOT contacted transportation departments on the East Coast where thin lifts have been applied for some time, and there has been success using highly modified polymer binders and a micro-milling technique for better adhesion. The polymer manufacturer even agreed to provide consultation and support during construction of the project, at no cost to ODOT.

"We're looking for an alternative to the 2-inch mill-and-fills we've been doing on open-graded courses," Jeff said. The thin lift approach requires less material and can be completed in less time, he added.

"We're also hoping to find an alternative to chip seals for non-interstate roads," Jeff said. "Chip seals deteriorate on interstates after two to three years, so that will be the bar for evaluation of this thin lift overlay," he added. "We actually anticipate it to last as much as five to eight years."

Jeff notes that there may be other applications for thin lift overlays within ODOT's jurisdiction if this test section performs as well as expected. Aside



from being a chip seal alternative, thin lift overlays could be applied to roads with ruts deeper than half an inch, and to open-graded wearing courses where deeper grinds and inlays have been required in the past. ▲