

Summer 2011

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WISCONSIN ASPHALT NEWS

ASPHALT. Wisconsin rides on us.

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Calendar of Events

- Aug. 18-19 Ames, Iowa
2011 Mid-Continent Transportation Research Symposium
- Sept. 29 Madison
Transportation Development Association (TDA) of Wisconsin 2011 Annual Meeting
- Oct. 27-28 Dallas, Texas
5th Asphalt Shingle Recycling Forum
- Nov. 2-4 Wausau
American Public Works Association (APWA) Wisconsin Chapter 2011 Fall Conference
- Nov. 29-30 Wisconsin Dells
2011 Annual WAPA Conference**
- Jan. 22-25, 2012 Palm Desert, Calif.
57th Annual National Asphalt Pavement Association (NAPA) Meeting

Rubblization Saves Money, Headaches on Highways

Concrete pavements are doing an admirable job ... crushed to pieces, serving as the base course for more than 140 lane miles of new asphalt pavement on Wisconsin highways in the last few years.

We wrote about rubblization in the Summer 2009 issue of *Wisconsin Asphalt News* ([read the article](#) [PDF]), and in the construction seasons that followed WisDOT has made great use of this technique to replace worn-out PCC pavements with new asphalt highways.

WAPA and its members—and motorists across the state—thank WisDOT for rebuilding these major highways with smooth, quiet, high-performing asphalt.

Why rubblize our highways?

The trend toward replacing PCC highways with HMA with the help of rubblization makes good sense. For reconstructing a pavement, the clear winner is rubblization and HMA.



Rubblization allows lanes of traffic to remain open during pavement reconstruction. (Images courtesy of FHWA)

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Rubblization Saves Money, Headaches on Highways

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- **It doesn't inconvenience motorists.** A pavement can be rubblized and paved with asphalt one lane at a time, allowing limited lane closures rather than requiring the detours, narrowed lanes and two-way traffic associated with construction of new PCC roads. Moreover, the work can be done at night and during off-peak hours. And as with the construction of any asphalt pavement, the new highway can be opened to traffic as soon as the surface has cooled, unlike PCC pavements which require days of curing time.
- **It gets the job done faster.** When heavily traveled corridors are involved, it's vital to get in and get out. Rubblizing PCC and laying new HMA is a very quick process compared with reconstructing with PCC. WisDOT recognizes this, too. For a 5½-mile stretch of WIS 13, the contract required completion of the entire project—including rubblizing and reconstructing the highway—in just 21 days. Try doing that with PCC.
- **Rubblization is less expensive—much less expensive—than PCC reconstruction.** Drawing from data in WisDOT's project records, we carefully compared the costs of a similar number of Wisconsin pavement reconstruction projects—both rubblization/HMA and PCC—in the last few years. This included all relevant costs: aggregate, asphalt or concrete cement, base course material, shoulder construction, traffic control, staking and mobilization.

The average cost per lane mile of HMA pavement constructed on rubblized PCC was \$268,000 per lane mile. The average cost per lane mile for comparable PCC reconstruction was \$815,000. That's *more than three times* more expensive for PCC. (If you would like the details about the analysis we conducted for this article, just call or email WAPA.)

And while WisDOT looks at life cycle costs when considering pavements, bear in mind that for any pavement—*asphalt or concrete*—about 90 percent of the life cycle costs are initial construction costs. (The state's cost analysis doesn't include user delay; when that's taken into account, asphalt becomes even more attractive.)

Perpetual Pavement for a few inches more ...

As great a job as WisDOT is doing with rubblization and HMA reconstruction, with only minor design modifications, the state could achieve a permanent solution: Perpetual Pavement. Wisconsin often designs its rubblization and HMA overlays as rehabilitation projects with expectations of a 15-year service life. Typically the thickness of the HMA layer for these pavements is 6 inches or less.

We discussed this practice with Matt Shinnars, Vice President of Antigo Construction, which specializes in providing rubblization vehicles and services. Shinnars shared some thoughts on Wisconsin's HMA designs: "I have worked with a number of states on rubblization for HMA reconstruction projects. In my experience, the asphalt pavements in Wisconsin tend to be on the thinner side compared with what other states are designing and building."

We followed up by performing elastic layer analysis based on the mechanical properties of mixes that can be measured with the Asphalt Mixture Performance Tester. (See the sidebar on page 3.) Based on those calculations we see an opportunity for Wisconsin to follow the national trends when it comes to HMA thickness. By increasing the pavement thickness to 8 to 10 inches on average, Wisconsin can construct Perpetual Pavement that will only require quick and convenient mill-and-fill when the time comes for surface treatment. (For more on Perpetual Pavements, read the National Asphalt Pavement Association's [overview page](#).) The design alternatives illustrated in the example on the following page are based on mechanistic-empirical design calculations.

Designing a Perpetual Pavement

Generally, changing existing rubblization-and-HMA designs to create Perpetual Pavements will increase the cost of an entire HMA reconstruction project by less than

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Recent Highway Rubblization Projects in Wisconsin

WisDOT Project ID	Highway	County	Project End Points	Length (lane miles)
1060-32-70	I-94	Waukesha	East/West Freeway - Roadway	40
1066-00-73	I-94	Jefferson	Madison - Milwaukee Road	23
1066-00-71	I-94	Jefferson	Madison - Milwaukee Road	22
1643-08-73	US 14	Vernon	Readstown - East County Line	11
5156-05-71	US 14	Dane	Madison - Oregon Road	21
1620-00-79	WIS 13	Marathon	Marshfield - Spencer	4
1053-02-78	WIS 29	Marathon	Abbotsford - Wausau	14
6140-00-75	WIS 13	Adams	Friendship - Wisconsin Rapids	6

Rubblization Saves Money, Headaches on Highways

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50 percent. This is a small investment considering the return: ultra long-lasting and high-performing highways, all with little if any user delay and inconvenience.

Example: Reconstructing I-94 in Jefferson County
WisDOT project ID 1066-00-73
22.9 lane miles

CURRENT DESIGN	PERPETUAL PAVEMENT ALTERNATIVES	
6.5" HMA 9" rubblized PCC 9" existing base	Increase to 7.75" HMA (low end for Perpetual Pavement)	OR Increase to 10" HMA (high end for Perpetual Pavement)
Total project cost: \$9.86 million	Project cost: \$10.95 million (increase of 11 percent)	Project cost: \$12.93 million (increase of 31 percent)

To provide more guidance on rubblization, WAPA is working with Antigo Construction to develop a rubblization guide. Look for an announcement from WAPA later this year. ■

Advanced Mix Testing in Wisconsin



WisDOT's new Asphalt Mixture Performance Tester will ensure that mixes perform in the field. (Image courtesy of IPC Global)

WisDOT's asphalt laboratory at the Truax Center in Madison has become more sophisticated this summer with the addition of a new piece of testing equipment. The Asphalt Mixture Performance Tester (sometimes called the Simple Performance Tester) is an innovative device that helps determine the performance of asphalt mixtures with respect to rutting and fatigue cracking. After gaining valuable experience with the AMPT's capabilities on a research project (see the state's [research project page](#) for details), Wisconsin moved forward with acquiring a device of its own with federal assistance.

The AMPT simply and accurately measures a mix sample's dynamic modulus (or stiffness) and flow number (an indicator of rutting potential), properties that are

key inputs to mechanistic-empirical design and help predict pavement performance. They are also critical values in the design and construction of Perpetual Pavements, helping to assure that these long-lasting pavements will function as designed, even on heavily traveled corridors.

As Wisconsin moves forward with reconstructing its highways, the AMPT will be an invaluable tool to building the high-performing asphalt pavements to serve motorists for decades to come.



WisDOT received hands-on training on the AMPT this summer from Larry James of InstroTek, IPC Global's distributor in the United States.

For details on this advanced testing tool, read the [specification sheet](#) [PDF] from manufacturer IPC Global. ■

Don't Forget Your (Tack) Coat!

Why use a tack coat?

Flexible Pavements of Ohio, the state's asphalt pavement association, spells out the answer in the introduction to its 2001 publication, [Proper Tack Coat Application](#) [PDF]:

The proper application of tack coat material is a key component of a quality asphalt paving project. Tack coat promotes a bond to underlying layers, facilitating achievement of maximum strength of the pavement structure. It prevents delamination and it ensures long-term performance and lasting ride quality to the highway user.

Perhaps the better question is: Why would anyone *not* use a tack coat?

WAPA understands some of the perceived objections. A standard tack coat extends construction time, adding several hours for the contractor to apply the tack coat and then wait for moisture to evaporate out of the emulsion. And on some projects a tack coat ultimately may not provide the intended bonding effect between asphalt lifts. In those cases, it can seem as though a tack coat means extra effort without added benefit.

But the bottom line is that a contractor is obliged to deliver items specified in a pavement construction project. If the tack coat step is skipped and the pavement lifts fail to adhere to one another properly, then it becomes the contractor's problem to fix—invariably a costly one.

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Don't Forget Your (Tack) Coat!

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A thin, even layer of tack coat ensures strong bonding between asphalt lifts. (Image courtesy of Pavement Interactive)

Rather than skipping the tack coat, a much better solution is to look at ways to ensure its successful application. We have laid out some considerations—best practices and alternative approaches—that will result in tack coats that get the job done right.

1. Follow proper application techniques. The success of a tack coat is dependent on proper application. For starters, applying an even layer on a clean, dry surface helps ensure performance. Spray bar height, spray patterns and sprayer nozzle alignment all have a significant effect on the evenness of the tack coat layer application as well. These and other considerations are laid out in Ohio's [guidance document](#) [PDF].

Equipment maintenance is equally important. For example, clean sprayer nozzles ensure even coverage of the tack coat material, whereas clogged nozzles lead to uneven application, streaking and reduced adhesion between asphalt layers. Contractors might consider specialty cleaning services like those provided by WAPA member 32 De-grease, which employ dry ice blasting of tack coat nozzles and application equipment. (See the Featured Member article on page 5.) This small investment can mean a major difference in performance.

2. Consider alternative products. Traditional tack

coats are sometimes tracked away from the intended application area by tires of construction vehicles or by everyday traffic if a tack coat surface is temporarily opened. This has a dual negative effect of leaving track marks on the road and, perhaps more importantly, of removing the tack layer laid to improve bonding between asphalt lifts.

Pavement owners and contractors who find tracking of tack material to be a problem might consider [Trackless Tack](#), a product developed by Blacklidge Emulsions based in Gulfport, Miss. The modifiers in Trackless Tack allow it to cure within 10 minutes of application. As the name suggests, vehicle tires do not track the material so there is no loss of tack material to adjacent areas, and the appearance of pavements and construction equipment is greatly improved.

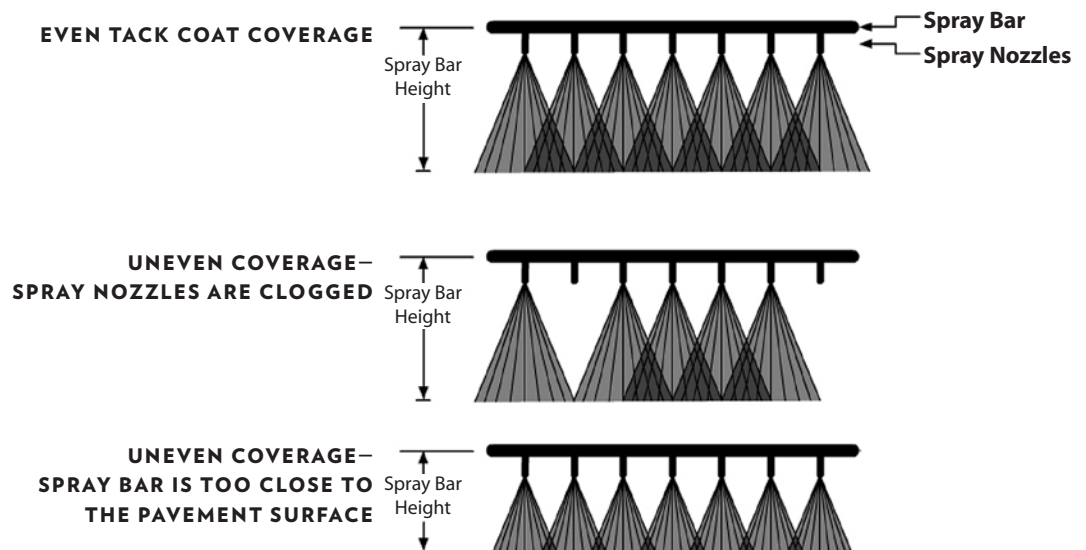
Research to date suggests that Trackless Tack is up to the task. The initial findings of a study by Louisiana Transportation Research Center, conducted through NCHRP project 9-40, "Optimization of Tack Coat for HMA Placement," showed that Trackless Tack performed well compared with traditional tack coat materials, and in some areas it outperformed traditional materials.

Tom Brokaw, Supervisor of WisDOT's materials testing laboratory, agrees that Trackless Tack is among the better options for tack coats. Brokaw confirms that Trackless Tack is allowable for use as a tack coat material for state projects.

A [research update](#) [PDF] from the investigators provides more technical details. For more information on the Trackless Tack, contact Codrin Daranga at Blacklidge Emulsions.

3. Follow WisDOT's lead. WisDOT understands the importance of tack coats as well as some of the challenges seen in everyday practice. Through the Wisconsin

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An even tack coat layer requires proper maintenance and configuration of the spraying equipment. (Images courtesy of Pavement Interactive)

Featured Member: 32 De-grease

32degrease.com

PRIMARY BUSINESSES:

Cleaning and equipment maintenance using dry ice

IN BUSINESS SINCE: 2009

LOCATION: *Headquartered in Baldwin, performing service on-site with WAPA members and other customers in Wisconsin, Minnesota and Iowa*



Next-generation cleaning

Dry ice blasting is a unique cleaning process well-suited for the asphalt industry. Steve Rositzki, Owner and President of 32 De-grease, explains the benefits: “Blasting asphalt residue with dry ice pellets causes loss of adhesion. The action of the dry ice reverting back to carbon dioxide gas assists in effortlessly stripping off the asphalt, leaving behind a totally clean surface.”

Rositzki compares this with traditional cleaning methods. “Rather than spending weeks cleaning a tack truck with solvents, abrasives and water that results in a substandard cleaning job, we can do the same work in a fraction of the time and leave a truck looking virtually brand new. What’s more, instead of being left with a mess and high disposal costs, the only remaining material is recyclable asphalt.”

Keeping equipment at peak performance

Dry ice blasting is safe to use on a wide range of components in asphalt equipment, including gears, electronics and material delivery systems. It’s a good fit for cleaning tack coat vehicles, where it’s critical to keep equipment in good working order to ensure an even flow of tack coat material. (See the related article on page 3.) Rositzki also notes the effectiveness of dry ice blasting on asphalt residue impregnated with rubber or fiberglass.



Dry ice blasting quickly restores a tack coat spray bar and nozzles to like-new condition. (Images courtesy of 32 De-grease)

Did you know ...

Approved by the U.S. Department of Agriculture, the Food and Drug Administration and the Environmental Protection Agency, dry ice blasting is the cleaning choice for a wide variety of applications and industries. It’s nontoxic and approved for use in the food industry. It’s tough enough for paint removal. Yet its nonabrasive, water-free characteristics make it the choice for restoring antiques—even books. For a range of cleaning jobs, from the tricky to the sticky, it just plain works. ■

‘EVERY DAY COUNTS’ UPDATE

Safety Edge and Warm Mix on Wisconsin Highways

Through the Every Day Counts initiative, FHWA is promoting two asphalt technologies that can make a big impact: the Safety Edge pavement treatment and warm mix asphalt. In the last issue of *Wisconsin Asphalt News*, we discussed Wisconsin’s participation in the Every Day Counts program. (Read the [article](#) [PDF] in the Spring 2011 issue.) Now that the construction season is here, we wanted to provide an update on deployment of these technologies in Wisconsin this summer.

The *Safety Edge* treatment creates a consistent 30-degree slope at an asphalt pavement’s edge to help prevent accidents associated with sharp drop-offs. In 2011, according to WisDOT Standards Development Engineer Erik Emerson, the agency has included the Safety Edge in six construction projects from sites in all five WisDOT regions.

Warm mix asphalt makes asphalt even greener with energy savings for construction and reduction in fumes and emissions. Warm

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Safety Edge and Warm Mix on Wisconsin Highways

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2011 Safety Edge Projects in Wisconsin

WisDOT Region	Highway	County	WisDOT Project ID
Southeast	WIS 144	Washington	4010-05-70
Southwest	WIS 69	Green	1690-00-60
Northeast	WIS 42	Manitowoc and Sheboygan	4570-05-71 and 4570-06-60
Northwest	US 2	Ashland	1180-00-73
North Central	WIS 73	Green Lake	6064-02-72
North Central	WIS 13	Price	1610-41-60



The Safety Edge is one of the Every Day Counts technologies finding its way into WisDOT projects this summer. (Image courtesy of FHWA)

mix asphalt has been used in various projects throughout Wisconsin in the past. (See the article at right.) As part of the Every Day Counts program in 2011, Wisconsin DOT plans to include warm mix on at least one project in each of the five WisDOT regions this season. The state is working closely with contractors to identify the most appropriate projects for warm mix. ■

Warm Mix Isn't Coming to Wisconsin ... It's Here!

Even as WisDOT coordinates with the federal initiative to deploy warm mix asphalt this summer, it's noteworthy that several counties have already made the move into trying WMA prior to this season. Interest is high across the state, and between the high performance and green aspects of WMA, it's no wonder.

Some of the large-quantity users of WMA in Wisconsin are Chippewa, Grant, Polk and Washburn counties. WMA has also been used to a lesser scale in Burnett, Dunn, La Crosse, Marathon, Sawyer and Taylor counties.



Warm mix is constructed at temperatures 50 to 100 degrees F cooler than hot mix. A number of counties across Wisconsin are already using it, with more to come this summer. (Photo courtesy of FHWA)

We spoke to representatives from these counties to learn a little more about why they're interested in warm mix. Here's a sampling of what we heard:

“We believe constructing roads with WMA is how we'll do business in the future, so we want to get familiar with it now.”

“Warm mix asphalt lets us keep current with asphalt pavement construction trends.”

“Our paving crews like working with warm mix; it's cooler than HMA, and doing hand work with it is easier, too.”

“Compared with hot mix, it really isn't costing us more money to use WMA.”

“We like the concept of being 'greener' in the way we construct our highways.”

From Rooftop to Blacktop

Recycling Shingles on the Interstate

Recent changes to WisDOT's specifications to allow recycling of asphalt shingles into new pavement surfaces has provided the opportunity for contractors to make a green statement.

Mathy Construction is making a very big, very green statement this summer.

Mathy is resurfacing 16 miles of eastbound I-90 and I-94 near Tomah that includes two lanes plus shoulders. This is a major project, with asphalt mix used exceeding 170,000 tons. Work is expected to be completed later this summer.

We discussed the project with Mathy's Director of Pavement Services Dan Staebell and Division Manager Andy Marinelli. "This was an ideal project to utilize the state's standard specifications on recycled asphalt shingles," says Staebell.

Marinelli provided the details: "In addition to the 15 percent recycled pavement, the original mix design called for 3 percent shingles. Once things got under way, we moved to 5 percent shingles, the maximum allowed by WisDOT's provision when recycled asphalt shingles are used in combination with other recycled materials."

Even for an industry where recycling is already the norm, the figures are impressive. "That translates into 6,000 tons of tear-off shingles—post-consumer waste that would otherwise need to be buried," says Marinelli. (The specific requirements and limitations for the use of recycled asphalt shingles are on page 199 of WisDOT's 2011 Standard Specifications, 460.2.5 "[Recycled Asphaltic Materials](#)." [PDF])

Staebell put this project in perspective: "We've been recycling asphalt for years, and we're pleased to be able to use yet another method that supports sustainability and minimizes waste."

WAPA notes that Wisconsin is among the leaders in asphalt shingle recycling. According to [ShingleRecycling.org](#), Wisconsin is one of only 10 states that allow tear-off shingles. Another dozen allow shingles recycled from manufacturers.

For making this new kind of green project possible and for turning it into a reality, we applaud the forward-minded efforts of WisDOT and Mathy. ■



*Recycled asphalt shingle grindings
(Image courtesy of Asphalt Contractor)*

NEW RESOURCE

WAPA Technical Bulletin on Asphalt Pavement Management

When the time comes to perform maintenance or rehabilitation on your network of roads, an army of salespeople will come peddling all manner of techniques, including seals, patches and other resurfacing techniques.



Across a road network, pavements will vary on the PASER scale. Shown here: a 10 (top), a 5 (middle) and a 2 (bottom). WAPA's new Technical Bulletin will help you implement a program to address repairs for the network of pavements as a whole. (Images courtesy of University of Wisconsin-Madison Transportation Information Center)

Despite the slick talk and big promises, it's a good idea to do your homework first and see how all options fit into your pavement management program. Some of these pavement treatments may well be a good fit for your needs, but if you don't have a sound basis for selecting which

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WAPA Technical Bulletin on Asphalt Pavement Management

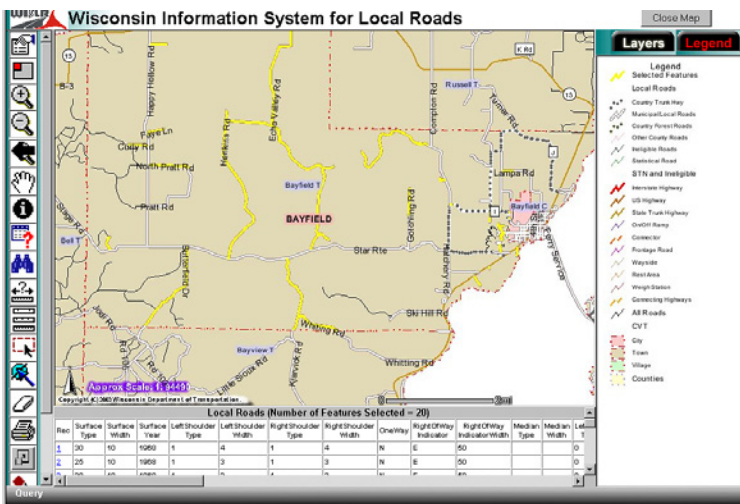
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option to use on which road, and if you don't have a reasonable expectation for what kind of results to expect, you are very likely due for disappointment.

There is a solution. To help a road agency of any size develop a pavement management program, WAPA is preparing a new Technical Bulletin titled *Asphalt Pavement Management*—look for an announcement later this summer.

This guidance document will help any agency assess the needs of all of the roads in its network. Agencies can benefit from the online tool they already use to report pavement surface conditions, Wisconsin Information System for Local Roads. WISLR data helps provide a picture of the condition of all the pavements in a jurisdiction. With this information in hand, an agency can start to consider different treatments and determine what impact they will have.

As spelled out in the Technical Bulletin, an asphalt pavement management system makes use of the Pavement Surface Evaluation and Rating system. PASER is a 10-point scale used to rate every mile of pavement logged in the



If you're already entering data into WISLR, you should take advantage of the system to help manage your road network. (Image courtesy of WisDOT)

WISLR system using a score from 10 (excellent surface) to 1 (failed surface). By considering every maintenance and rehabilitation technique in terms of how much it will boost a pavement's PASER rating and for how long, an agency can make informed choices based on long-term cost-effectiveness.

The Technical Bulletin will also provide guidance on different repair options, drawing a distinction between maintenance and rehabilitation. Maintenance options are predominantly cosmetic; they do not improve the structure of the pavement, and they are inappropriate for poor pavements (rated 4 or lower on the PASER scale). On the other hand, rehabilitation options add structural integrity to a pavement and can add years of life. For poor pavements, these are the only cost-effective solutions for an agency looking to maintain the long-term integrity of the road system.

The expected benefits of a number of maintenance and rehabilitation options are detailed in the Technical Bulletin. Also included in this guidance document are other useful items to help define a pavement management program, including long-term management approaches and considerations to help optimize the economics of pavement repair. ■

Don't Forget Your (Tack) Coat!

from page 4

Highway Research Program and with the guidance of asphalt stakeholders in the state, WisDOT initiated a research project to establish best practices to improve tack coat performance.

We spoke to Professor Jim Crovetto of Marquette University who is wrapping up the WHRP project [Performance Evaluation of Tack Coat Materials](#) this summer. Crovetto tells us, "Through this project, we're looking to validate or expand the current protocols for how tack coat is applied. It's a comprehensive approach looking at the impact of environmental factors like moisture and temperature as well as application rates of standard and diluted tack coat materials."

Crovetto continues, "We're also investigating a wide range of materials as well, ranging from traditional emulsified asphalt, straight PG-grade binder and Trackless Tack." The study includes lab and field components, and will provide comparison performance for tack coats applied in varying real-world conditions (on clean surfaces versus dirty ones, for example).

Brokaw advises that when this research project is completed, the results will be used by WisDOT's HMA Tech Team to determine possible improvements to its tack coat specifications. WAPA participates on that committee, and we'll keep you posted.

In the meantime, if you're unsure about your current tack coat procedures, very likely there's room for improved performance with minimal extra effort or expense. Please contact WAPA and let us help you find the answers you need. ■

Mission

Promote quality hot mix asphalt pavements which are safe, efficient and in the best interest of the customer.

Vision

Professionals dedicated to making HMA the customer's preferred choice in pavement solutions through innovation, education and exceptional service.

Values

- * STEWARDSHIP
- * EXCELLENCE
- * INNOVATION
- * PROFESSIONALISM
- * ACCOUNTABILITY

Contact Us!

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THE GREEN NEWSLETTER

Sign up today so you don't miss a single issue of *Wisconsin Asphalt News*, WAPA's electronic newsletter.

Just click the sign-up link on our home page, wispave.org. This will also give you the opportunity to subscribe to e-announcements from WAPA covering the environment, policy, economics and engineering.

2011 Asphalt Design Competition Winners

For the second year in a row, University of Wisconsin-Platteville took home the top prize in WAPA's Asphalt Design Competition. The \$1,000 award is shared by students James Des Jarlais, James Gallagher, William McElroy, Brandon Schwenn and Brady Seston.

The 2011 competition format included submission of Superpave gyratory compaction specimens, test data and a written report. Through these items and a live presentation, each team demonstrated its understanding of HMA design, including mix design, pavement structure design and project management engineering.

The team from UW-Madison placed second this year, and the Marquette University team came in third. Congratulations again to the team from UW-Platteville, and thanks to all participants for their hard work. ■



2011 Asphalt Design Competition winners from UW-Platteville: (left to right) Brandon Schwenn, William McElroy, James Des Jarlais, James Gallagher and Brady Seston.

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