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Did you know ...

The urban heat island effect is not a black and white issue. Porous asphalt pavements have been shown to lower nighttime surface temperatures as compared to impervious pavements. In at least one city, the hottest heat signature is at the airport, with its thick, dense, impervious concrete runways.

Mn/DOT Received 6th Perpetual Pavement Award

The Minnesota Department of Transportation (Mn/DOT) has been the recipient of six National Perpetual Pavement Awards over the past six years for the following roadways:

- Interstate 35 near Willow River in 2002,
- USTH 71 south of Park Rapids in 2003,
- USTH 10 in Anoka in 2004,
- TH 18 between Garrison and Brainerd in 2005,
- TH 61 between Wabasha and Kellogg in 2006, and
- USTH 71 near New London in 2007.



Picture taken at the 2008 Perpetual Pavement Awards Banquet, left to right: Randy West, National Center for Asphalt Technology; Mike Acott, National Asphalt Pavement Association; Chris Duininck, Duininck Bros., Inc.; Jason Duininck, Duininck Bros., Inc.; Dave Trooien, Mn/DOT; Jill Thomas, MAPA; Peter Grass, Asphalt Institute; Mike O'Leary, Asphalt Pavement Alliance Co-Chair

The criteria for this prestigious national award are pavement sections that are 35 years or older, have not had major structural failure, has on average at least 13 years between overlays, and should demonstrate excellence in design, quality in construction and value to the traveling public.

Through projects such as these, Minnesota played an outstanding role in the history of transportation, technological change, and asphalt construction thanks to the

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Recycling Asphalt Shingles - Black Gold!

Recycling asphalt pavement (RAP) back into hot-mix asphalt (HMA) pavements has been a tried and true, cost-effective technology in Minnesota for over 30 years. Utilizing shingles from manufacturing operations is also a proven technology allowed in the Minnesota Department of Transportation (Mn/DOT) Bituminous 2360 specifications.

Recently agencies are inquiring into the use of tear-off shingles from roofs (free from nails and other debris) in HMA. This is another great source of asphalt, fibers, fine aggregate and mineral filler commonly used in HMA rather than placing waste tear-off shingles in a landfill.

Processing the tear-off shingles

is a critical component for successful use in HMA. A guide on the processing of waste asphalt shingles is *Recycling Tear-Off Asphalt Shingles: Best Practices Guide* available from the Construction Materials Recycling Association (CMRA) at www.shinglerecycling.org.



An article by Kent Hansen, P.E. (Jan/Feb 2009 *Hot Mix Asphalt Technology*, National Asphalt Pavement Association) discusses the benefits of re-using the “black gold” from shingles. The article states that if all the 11 million tons of waste asphalt shingles generated annually were used in HMA, the savings would

be approximately \$1 billion. This would also reduce the demand for new asphalt cement by at least 2 million tons.

The article summarizes available literature and discusses that waste shingles have been re-used effectively in HMA. Lab tests cited show that the use of shingles can improve resistance of HMA against low-temperature cracking and high-temperature rutting. The field performance of HMA with recycled shingles is reported to be good. In fact, the performance of HMA with about 5 percent recycled shingles has been shown to be equal or better than mixes with all virgin materials. See also the Federal Highway Administration’s web site for more information at <http://www.tfhr.gov/pubrds/05jan/02.htm>.

Calendar of Events

53rd Annual Asphalt Contractors’ Workshop/ Quality

Initiative Workshop

Wednesday, March 4, 2009 · Earle Brown Heritage Center · Brooklyn Center · E-mail info@mnapa.org for further information.

Environmental Training

Thursday, March 5, 2009 · Hampton Inn North · Shoreview · E-mail info@mnapa.org for further information.

World of Asphalt Conference

March 9-12, 2009 · Orange County Convention Center · Orlando, FL · www.worldofasphalt.com

Association of Asphalt Paving Technologists (AAPT)

Annual Meeting

March 16-18, 2009 · Marriott City Center · Minneapolis · www.asphalttechnology.org

Legal Training

Wednesday, March 25, 2009, 9 am to Noon · Hampton Inn North · Shoreview · E-mail info@mnapa.org for further information.

Flagger Train-the-Trainer

Monday, March 30, 2009 · 9 AM - Noon · MnDOT St. Cloud Office · E-mail info@mnapa.org for further information.

Smoothness Training

Wednesday, April 29, 2009 · MnDOT Arden Hills Facility · Shoreview · E-mail info@mnapa.org for further information.

PerRoad Express and Life Cycle Cost Analysis (LCCA)

Express Software Training

Monday, May 18, 2009 · Location To Be Determined · E-mail info@mnapa.org for further information.

Mn/DOT Received 6th Perpetual Pavement Award, continued from page 1

progressive vision and partnering efforts of agency and industry representatives. These projects have demonstrated outstanding design, construction, and performance value for more than 35 years of service to the traveling public of Minnesota and continue to do so today.

A new Perpetual Pavement is designed and constructed so that any distress occurs in the top layer only. Typically, the only rehabilitation required is removal of the surface and resurfacing with an asphalt overlay. Using current pavement technologies, this can be done on an infrequent basis - 15 to 20 years. The reclaimed material is then recycled. Perpetual Pavement is the ultimate in sustainable design, construction, and equity.

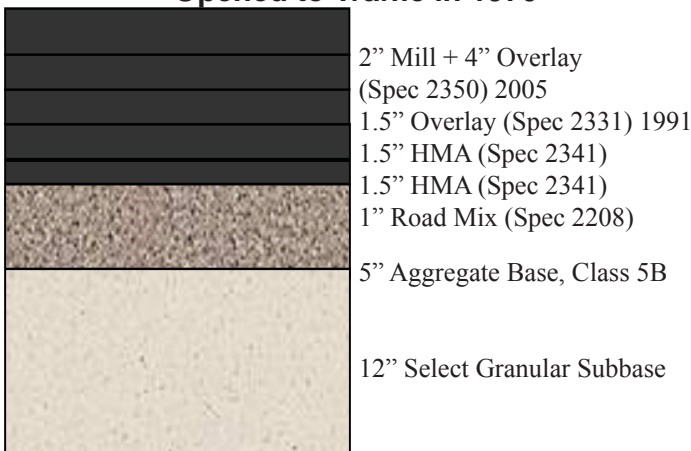


While the Perpetual Pavement name is relatively new, the concept is not. In fact, TH 71 is one of the more than 35 pavements nation-wide that have received the Perpetual Pavement Award since 2001.

Overlays can be placed in varying thicknesses, allowing the engineer flexibility to design according to the needs of the roadway. Hot-Mix Asphalt (HMA) overlays are one of the most cost effective, efficient, and versatile pavement preservation options available. The benefits include additional structural capacity, quality management in construction, enhanced skid resistance, reduced noise levels, improved ride, improved drainage, enhanced aesthetics, and extended service life, thus improved life cycle costs savings.

A thin HMA overlay (thickness less than two inches) is an excellent option for structurally sound flexible pavements and is compatible with future maintenance activities. Thin overlay and stage construction are viable and cost-effective means to prolong the life of low, medium, and high volume HMA pavements. Each of these award-winning pavements has received a thin overlay (ranging from 3/4" to 2" thick) in their lifetime and they are still going strong.

2007 Perpetual Pavement Award TH 71 from MP 138+0.732 to MP 144+0.273, Near New London Opened to Traffic in 1970



1991 (21 years of service) 1.5" Overlay (Spec 2331)
2005 (14 years after 1st overlay) 2" Mill and 4" Overlay (Spec 2350)

Congratulations Mn/DOT!

NAPA Awards

At the National Asphalt Pavement Association's 54th Annual Meeting (held January 2009 in San Diego, CA) the following MAPA contractors' received a "Quality in Construction Award" for paving:

construction Award" for paving:

- ◆ Knife River Corp. - North Central (TH 27),
- ◆ Knife River Materials, Bemidji (TH 2),
- ◆ Knife River Materials, Bemidji (Beltrami CR 19),
- ◆ Knife River Materials, Bemidji

(Bemidji Airport Improvements),

- ◆ Midwest Asphalt, Hopkins (City of Eden Prairie, Mill & Overlay), and
- ◆ Valley Paving, Shakopee (TH 65 & I-35W).

Congratulations to all the winners!

Minnesota Asphalt Pavement Association

HMA Pavements & LEED Certification

By Richard O. Wolters, P.E., Executive Director, Minnesota Asphalt Pavement Association; and Jill M. Thomas, P.E., Associate Director, Minnesota Asphalt Pavement Association

Global economic competition, metropolitan congestion, and global climate change are among the new dynamics that require new thinking in the nation's transportation and development systems of the future.

Did you know that the production and placement of hot-mix asphalt (HMA) pavements consumes less fuel and produces lower levels of greenhouse gases? According to a recent study, HMA pavements require about 20 percent less energy to produce and construct than other pavements.¹ Less fuel consumption means less production of carbon dioxide and other greenhouse gases.

Also, since 1970, the asphalt industry has decreased total emissions from hot-mix plants by 97 percent while increasing production by 250 percent.² Emissions from asphalt plants are so low, the EPA considers them as only minor sources of industrial pollution.³ To further decrease emissions, warm mix asphalt technology has been developed and implemented (see next article).

Currently there are considerations for the urban heat island (UHI) effect, and it is not a black and white issue. According to the United States Environmental Protection Agency, "there is no official standard or labeling program to designate cool paving materials and research in this area is in an



early stage."⁴ While studies show that pavements can affect the urban heat island and resulting air quality, results are complicated by several factors including the impact of shadows from nearby structures; changes in pavement characteristics over time; and the absorption by buildings of solar radiation reflected from the pavement surface. An article published in Public Works emphasizes that factors other than pavement color play a large role in urban heat island mitigation and that many strategies for reducing the UHI effect are being explored.⁵

Sustainability can be defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.⁶ Sustainable development is a common issue these days, and HMA is a "sustainable" pavement. The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is one rating method used to evaluate a building or construction project's environmental performance.

There are several ways that using HMA fits into the LEED Green Building Rating System.™ Managing storm water with porous or dense-grade HMA is one method that has been used in Minnesota with great popularity over the past five years and allows for infiltration of storm water on-site.

The concept of managing storm water with porous or dense-graded hot mix asphalt (HMA) pavements has been used successfully since the 1970's in the United States and Europe to provide a solution to storm water runoff as well as groundwater table recharge. HMA pavements have been used in various climate conditions with the benefits of providing runoff control, aquifer recharge, reduction of drainage structures needed to comply with storm water regulations, and increased skid resistance and safety.

The most common locations for use include parking lots and low volume roads, and in high activity recreational areas like basketball and tennis courts or playground lots. A typical HMA pavement section consists of either a porous or a dense-graded HMA pavement over a porous, large stone aggregate base course that has sufficient void space designed for runoff detention, frost penetration, and structural capacity.

The ability to recycle asphalt pavement (RAP) and shingles and

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www.asphaltisbest.com

Warm Mix Asphalt in MN

By Richard O. Wolters, P.E., Executive Director, Minnesota Asphalt Pavement Association; and Jill M. Thomas, P.E., Associate Director, Minnesota Asphalt Pavement Association

With the United States Clean Air Act passing into law in 1970, environmental responsibility has been a major priority to U.S. Industries and abroad. The hot-mix asphalt (HMA) industry is no exception and has taken great initiatives to be leaders in these initiatives.

Today, the production and placement of HMA pavements consumes less fuel and produces lower levels of greenhouse gases. According to a recent study, HMA pavements require about 20 percent less energy to produce and construct than other pavements. Less fuel consumption means less production of carbon dioxide and other greenhouse gases.

Also, since 1970, the asphalt industry has decreased total emissions from HMA plants by 97 percent while increasing production by 250 percent. Emissions from asphalt plants are so low, the EPA considers them as only minor sources of industrial pollution.

Currently there are initiatives for reducing the temperature at which HMA is produced and placed and thus further reducing emissions and energy used, as well as many other benefits.

Warm Mix Asphalt (WMA) technology allows the mixing, laydown, and compaction of asphalt mixes at significantly lower temperatures compared to HMA. The technology can reduce

production temperatures 35°F to 100°F lower than conventional HMA. A scanning committee in the U.S. was formed in 2002 to investigate the European technology and pursue research and development work necessary for implementation. Today there are a countless number of successful WMA projects throughout the nation.

The number of WMA technologies is expanding. They involve designing the mix with either a chemical additive, an organic additive, or by a foaming mechanism. Each of the technologies available are discussed at a web site dedicated to WMA information at www.warmmixasphalt.com.

To date, there have been four projects in Minnesota with WMA technology.



In 2007, Goodhue County State Aid Highway 11 (537 tons placed in 4,200 feet of the eastbound lane) and Olmsted County Road 104 (5 miles) were constructed using a chemical additive called Revix that was developed by Mathy Technology



and Engineering Services, Inc. A variety of surfactants, waxes, processing aids, polymers, acids and other materials are used in Revix to reduce the internal friction at reduced temperatures of 60 to 80°F below typical conditions.

In 2008, Crow Wing County Road 108 (2,600 tons of WMA, 2 miles) and a trail in northwestern Minnesota were paved on separate dates by Anderson Brothers Construction Co. Evotherm G3 was used which is a non-proprietary technology developed especially for WMA by MeadWestvaco Asphalt Innovations in the United States.

There were little to no changes in operations with the use of warm mix asphalt. The temperature at which the mix was produced was reduced from 280°F by increments of 20°F with the lowest temperature at 225°F. Very successful density was accomplished for both the HMA and WMA. Recycled asphalt pavement (RAP) was used in the mix.

Spotlight on Michael A. Barnes, P.E., Mn/DOT Engineering Services Division Director



An interview by Jill Thomas, P.E., Associate Director, Minnesota Asphalt Pavement Association

Mike's background in technology, engineering, partnering, and customer service will serve him well as he takes on his new role as the Engineering Services Division Director at the Minnesota Department of Transportation (Mn/DOT).

While his father was in the Navy, Mike was born in Portsmouth, Virginia, and his family later came to Minnesota when he was a toddler. Mike was first introduced to the field of Civil Engineering when he joined the Minnesota National Guard his senior year in high school to become a bridge crew member in an Engineer Bridge Company out of Hutchinson. His unit built float bridges across the Mississippi River and dry span bridges to carry tanks across. He spent over 22 years in the National Guard, most of it with the 682nd Engineer Battalion in central Minnesota. Mike held many different positions such as a Bridge Platoon Leader, Construction Company Commander, and Battalion Staff Officer that designed and constructed many projects. Before retiring in 2003, he spent his last five years working at Camp Ripley Facilities as a State Environmental Engineer.

Mike started with Mn/DOT in 1985 as a Traffic/Pre-Design Technician in the District 8 headquarters in

Willmar. He rode with a couple of co-workers including Ron Mortensen, currently the Meeker County Engineer (see Spotlight Article, Paving Progress, August 2007) from Willmar to the University of Minnesota to take night school classes. He received his Bachelor of Civil Engineering degree in 1994.

As an Engineer, Mike rotated in the Mn/DOT Rotation Program between District 8 Construction, Metro District Maintenance, State Maintenance, State Construction, and the Bituminous Office. He moved into a State Global Positioning System (GPS) position, which evolved into Mn/DOT's Geographical Information Systems (GIS) Engineer in the late 1990's during the initial development and use of the new technology. In 2003, Mike became the Director of Information Technology and worked closely with everyone in the Department to improve Information Technology (IT) processes. Mike notes that being in these technology leadership roles has allowed him to better understand and work closely with Mn/DOT Offices and Districts with their innovation needs.



When asked what opportunities and challenges face him as the new Engineering Services Division Director, he said "being part of the team to rebuild the trust and confidence in Mn/DOT and establishing an excellent environment to build strong partnership are the biggest opportunities. There will always be challenges, with funding high on most everyone's list. If we all work together, these challenges can be overcome or at the very least, we'll be further along than if we don't!" Mike is responsible for 540 people in his Division. He notes that he has an

excellent staff that is known for their excellent technical skills and providing great support.

Mike met his wife, Sherri, in college and they have three kids. Their oldest son, Tony, recently graduated from college and is working as a Radiation Therapist in Duluth. Jason, is a Junior at St. Cloud State, studying Accounting, and their youngest, Kayla, is a Junior in High School. As a family, they have been very active in soccer and wrestling over the years. In his spare time, Mike enjoys remodeling houses and hunting deer and fowl.

Best of luck Mike, and thanks for helping to build 'em black!

HMA Pavements & LEED Certification,

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the fact that it is produced locally make asphalt eligible for a large number of Materials and Resources credits. Also, warm mix and high-RAP (>10%) mixes⁷ offer several advantages which may receive credit under Innovation and Design. When all these factors are considered, asphalt pavements can contribute more LEED credits than other pavement types. Visit MAPA's web site at www.asphaltisbest.com or www.pavegreen.com for more information.

References:

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Roadway Construction: Energy Consumption and Material Waste Generation of Roadways," American Society of Civil Engineers, Reston, VA. Proceedings of 2005 Construction Research Congress. (www.pubs.asce.org)

2. Report to NAPA Members 2001, National Asphalt Pavement Association, Lanham, MD. 2002.

3. Federal Register, February 12, 2002, pp. 6521 ff. (http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2002_register&docid=02-3348-filed.pdf, accessed August 15, 2007). Also, Federal Register, November 8, 2002, pp. 68124 ff. (<http://a257.g.akamaitech.net/7/257/2422/14mar20010800/edocket.access.gpo.gov/2002/pdf/02-28502.pdf>, accessed August 15, 2007).

4. USEPA Heat Island web site, Cool

Pavements: <http://www.epa.gov/heatisland/mitigation/pavements.htm> accessed January 15, 2009.

5. Golden, Jay, and Kamil Kaloush, "A Hot Night in the Big City: How to Mitigate the Urban Heat Island," Public Works, December 2005. (<http://www.pwmag.com/industry-news.asp?sectionID=760&articleID=268116>, accessed January 15, 2009.)

6. Brundtland Report, "Our Common Future," Oxford: Oxford University Press, 1987.

7. "Asphalt Pavements and the LEED Green Building System," Publication PS-32 and "Asphalt for Sustainability – Setting the Record Straight," Publication PS-31, National Asphalt Pavement Association, www.hotmix.org.

Do you have questions about how to design hot-mix asphalt pavements, porous pavement, storm water management with HMA, stone matrix asphalt, warm-mix asphalt or other new technologies? Are you looking for information regarding how HMA can help you to meet environmental requirements or concerns?

Please visit our web site at www.asphaltisbest.com or e-mail info@mnapa.org to **schedule a Lunch & Learn session!**

MAPA Contractor Members

- Anderson Brothers Constr. Co.
- Barton Enterprises, Inc.
- Bemidji Bituminous, Inc.
- Bituminous Paving, Inc.
- Bituminous Roadways, Inc.
- Commercial Asphalt Co.
- DMJ Corporation
- Duininck Bros., Inc.
- FPI Paving Contractors, Inc.
- Hardrives, Inc.
- Hawkinson Construction
- Knife River Corp. - N.C.
- Knife River Materials
- M.R. Paving & Excavating, Inc.
- Mark Sand & Gravel Co.
- McNamara Contracting, Inc.
- Mesabi Bituminous, Inc.
- Midwest Asphalt Corporation
- Minn-Dak Asphalt, Inc.
- North Valley, Inc.

- Northern Paving, Inc.
- Northland Paving, LLC
- Northwest Asphalt, Inc.
- Pine Bend Paving, Inc.
- Plehal Blacktopping, Inc.
- River Bend Asphalt Company
- Rum River Contracting Co.
- Shamrock Enterprises of Rochester LLC
- Straight River Asphalt LLC
- T.A. Schifsky & Sons, Inc.
- Tower Asphalt, Inc.
- Tri-City Paving, Inc.
- Ulland Brothers, Inc.
- Valley Paving, Inc.
- Wm. Mueller & Sons, Inc.
- W W Blacktopping, Inc.

MAPA's Associate Members

Accurate Test Systems, Inc.
 Aggregate Industries
 American Agency, Inc.
 American Engineering Testing, Inc.
 American Surface Lines, LLC
 Anderson Industrial Scales, Inc.
 Antigo Construction, Inc.
 Area Lakes Testing
 Arr-Maz Custom Chemicals
 Asphalt Surface Technologies Corp.
 Bomag Americas
 Braun Intertec Corporation
 Brock White Company LLC
 Carlson Paving Products, Inc.
 Caterpillar Paving Products Inc.
 Cedarleaf, Cedarleaf & Cedarleaf, Inc.
 Century Fence Co.
 Certainteed Corporation
 Citicapital Construction Equipment Finance
 Clarence Richard Company
 Cobb Strecker Dunphy & Zimmermann
 Construction Bulletin
 Crysteel Truck Equipment, Inc.
 Custom Welding & Metal Fab, Inc.
 Dahl Trucking
 Dem-Con Companies
 Dillman Equipment
 J.D. Donovan, Inc.
 Dresser Trap Rock Company
 Erickson Engineering Company
 Esch Construction Supply, Inc.
 Ess Brothers & Sons, Inc.
 EverCore LLC
 Fabyanske, Westra, Hart & Thomson, P.A.
 FC Stone
 T.C. Field & Company
 Flint Hills Resources, LP
 Foth Infrastructure & Environment, LLC
 Gencor Industries, Inc.
 Grant Thornton LLP
 Hayden-Murphy Equipment Co., Inc.
 Highway Technologies
 HTIF Cameron Filters
 Humboldt Manufacturing
 I.R.A.Y. Auction
 Independent Testing Technologies, Inc.
 Inspec, Inc.
 Interstate Engineering, Inc.
 Intex Corporation

J-CRAFT
 Johnson Crushing, Inc.
 Klein Agency, Inc.
 Kraemer Mining & Materials, Inc.
 Laser Control, Inc.
 Leonard, Street & Deinard, P.A.
 L.G. Everist, Inc.
 Lubrication Technologies, Inc.
 Marathon Petroleum Company LLC
 Martin Marietta Aggregates
 Max Steininger, Inc.
 Minnesota Petroleum Marketers Assoc.
 Minnesota Trucking Association
 Murphy Oil USA, Inc.
 Northern Balance & Scale
 Northwest Process Equipment, Inc.
 Nuss Truck & Equipment
 Olson & Price, Ltd.
 Partek Supply, Inc.
 Prinsco, Inc.
 R & G Construction Company
 RDO Equipment Co.
 Ritchie Bros. Auctioneers (America) Inc.
 RJ Ahmann Company
 Road Machinery & Supplies Co.
 Roadtec, Inc.
 Ruffridge-Johnson Equipment Co., Inc.
 RB Scott Company, Inc.
 SPC Engineering & Testing, Inc.
 STORK Twin City Testing Corporation
 Swanston Equipment Companies
 Testquip, LLC
 TexPar Energy, LLC
 Tricon Metals & Services, Inc.
 Tri-State Aggregate Machinery
 Troxler Electronic Lab., Inc.
 Ulteig Engineers, Inc.
 Unique Paving Materials Corporation
 Vance Brothers
 Volvo Construction Equipment
 Weiler
 Wenck Associates, Inc.
 Wheeler Lumber LLC
 Widseth Smith Nolting
 Ziegler, Inc.

Welcome New Associate Members:
 Eric J. Anderson, Ind. Agent - AFLAC
 Rotochopper, Inc.



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