

OHIO ASPHALT

ISSUE 2 VOLUME 8

SPRING 2011

The image features a man in a dark suit and plaid shirt holding a framed certificate. The certificate is titled "2010 QUALITY AWARD FOR ASPHALT PAVING" and is presented to "Eric Blocktop, Inc.". It mentions "Asphalt Roads" and "Flexible Pavement". The background is a collage of asphalt-related images and text. On the left, a blue banner says "RIDES ON US Asphalt." and a large black banner says "BUILD ON US AsphaltRoads.org". On the right, a purple banner says "A RIDES ON US Asphalt." and a large black banner says "LIVE ON US AsphaltRoads.org". At the bottom right, a black banner says "Asphalt... Defining Value! Safe, Smooth and Sustainable". At the bottom left, a white banner says "OHIO RIDES ON US Asphalt."

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OHIO ASPHALT

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ON THE COVER: ERIE BLACKTOP INC.'S BOB BOEHK ACCEPTS A QUALITY AWARD FOR HIS COMPANY'S WORK AT THE HURON RIVER BOAT LAUNCH FACILITY. IT WAS ONE OF 39 PROJECTS HONORED AT THIS YEAR'S 49TH ANNUAL MEETING, EQUIPMENT EXPO & TRADE SHOW'S AWARDS LUNCHEON. FOR A LOOK AT THE 2010 QUALITY AWARD WINNING PROJECTS, SEE PAGE 12.



Flexible Pavements of Ohio is an association for the development, improvement and advancement of quality asphalt pavement construction.

Ohio Asphalt is published by Flexible Pavements of Ohio four times a year. Advertising deadline is the 1st of the month preceding publication. Ohio Asphalt is not copyrighted and portions may be reprinted with the permission of Flexible Pavements of Ohio. 525 Metro Place North, Suite 101, Dublin, OH 43017: telephone: 614.791.3600, 888.446.8649; website: www.flexiblepavements.org

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THE PRESIDENT'S PAGE



CLIFFORD URSICH, P.E.
PRESIDENT & EXECUTIVE DIRECTOR

“My job is to advocate for asphalt pavement use – MORE TONS! Like all advocacy groups, we make claims and assertions with the purpose of helping customers discern the value of our product in meeting their needs. In our case we seek to communicate the value of asphalt pavement; that it is Safe, Smooth and Sustainable. Other groups have made similar assertions, but just as pavement and treatment types vary so do their attributes vary; some more suited to meet the customers’ needs.”

‘WITHOUT DATA YOU’RE JUST ANOTHER OPINION’

Flexible Pavements of Ohio (FPO) has participated in the Transportation Construction Coalition Fly-In since the event’s inception; that was 1996. Each year the FPO staff and leadership saddle up and head to Washington, D.C. to visit with Ohio’s legislators and make the case for transportation investment. Participating in such an event is an eye opener. You soon realize that taking personal responsibility for advocating your position is the only assurance that your message will be heard. With so many special interest groups clamoring for legislators’ attention, it’s necessary to advocate often, and with data, to make your point stick.

At one particular Fly-In, while awaiting our appointment with a representative, we noticed a plaque on a bookshelf in his lobby. The plaque had a message that put everyone advocating a “cause” on notice that they better be ready to substantiate their position. Imagine with me for a moment a revolving door of special interest groups; in and out, in and out, all day long, each representing a “worthy cause” and each with their hand out asking for support. Clearly, being a congressional representative or senator is no easy task; it requires great discernment and being discerning requires data. The particular representative we were visiting was a seasoned veteran who demonstrated such discernment; the plaque on his lobby bookshelf gave evidence of this. It read, *“Without data you’re just another opinion.”* That plaque spoke a truth, and it is a truth that is equally helpful to those of us entrusted with positions of authority, positions in responsible charge of the public’s assets. In this case, I’m referring to pavement professionals; folks who, on a daily basis, are responsible for determining what

paving materials provide the public the greatest value.

ASPHALT ... DEFINING VALUE!

My job is to advocate for asphalt pavement use – MORE TONS! Like all advocacy groups, we make claims and assertions with the purpose of helping customers discern the value of our product in meeting their needs. In our case we seek to communicate the value of asphalt pavement; that it is Safe, Smooth and Sustainable. Other groups have made similar assertions, but just as pavement and treatment types vary so do their attributes vary; some more suited to meet the customers’ needs.

Paving materials do not have equivalent attributes; the data says so. Oh, we may design the thickness of each for a particular road based on like factors such as the weight and amount of traffic, and engineering factors such as soil strength and material property strengths, but that’s just about as far as equivalency can go. Attributes of quietness, smoothness, perpetual pavement life, and recyclability and so on, all are meaningful to both the pavement owner and the traveling public. To ensure the traveling public receives the highest value, the data of pavement attributes need to be considered when deciding what paving material or treatment type should be used. After all, it is the public that we are building the road for, isn’t it? That’s being discerning, and discernment is what the public expects.

Determining the highest value is a two-part equation; the first is cost, the second is attributes received. In engineering school we learned this as the Benefit to Cost analysis. If we fail to consider the attributes that differentiate

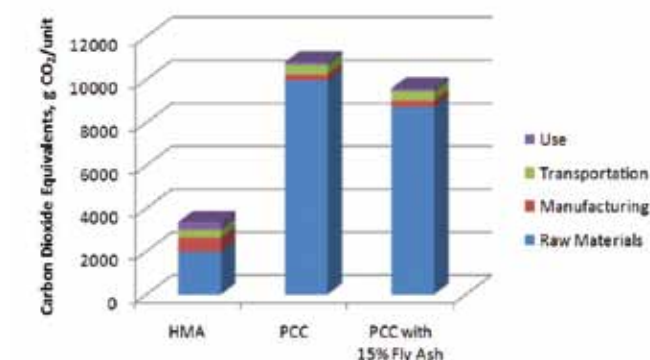
the pavement types, then we have ignored the “B” (benefit) component of the B/C analysis. This is where alternate and optional bidding of pavement types fall woefully short. Under that contract bidding method the pavement types being bid against each other are presumed to be equivalent. That indeed is presumptuous because the competing pavement types simply are not equivalent. Pavement materials differ vastly when we evaluate them for the attributes they provide; and that is not an opinion. It’s all validated by data.

DATA OR OPINION

Asphalt pavements are Safe, Smooth and Sustainable. When we consider the matter of safety we must first affirm that all roads designed by engineering professionals are done so to provide the highest degree of road-user safety. As such, regardless of pavement type, roadways are designed with precise geometry and construction specifications to ensure pavements are constructed with materials and surface textures that promote safe vehicle handling. Where asphalt begins to differentiate itself is in its ability to be manufactured using a variety of mix types that can enhance surface friction; as well, periodic wearing-course restoration ensures smooth travel, and a simple fact is the contrast between black asphalt and lane markings enhances safety. Whether it is Open Graded Asphalt Friction Course (OGFC), Smoothseal (ODOT Item 424, Type B, Fine-Graded Polymer Asphalt Concrete) or conventional asphalt mixtures utilizing

high-friction aggregate, these treatments address high-accident locations to keep traffic moving safely and smoothly. Smoothseal, for instance, has a silica requirement that is the most stringent of any paving material. So strict is this specification that it is seen only in glass manufacturing. Smoothseal history shows sustained high, wet-friction numbers. With some of our oldest Smoothseal pavements we are still getting friction numbers as good as or better than conventional mix (i.e. Ave. 49 in six to eight years); that’s a data point worth noting.

Smoothness is pretty much a no-brainer. Clearly, the data shows, and our Seat-O-Meters further validate that asphalt pavement provides the highest level of service (i.e. ride quality) of any pavement or treatment type. Documented in the Ohio Department of Transportation Pavement (ODOT) Design Manual, you will find that newly constructed asphalt surfaces typically have an initial serviceability of 4.5, whereas concrete is 4.2. Now that may not seem like much of a difference, but when you consider the scale maxes out at 5.0 and a road that is unbearably rough rates at 2.0, a three-tenths difference equates to a whole bunch of smoothness. In 2003, this data was confirmed



(Source: Brian Prowell, PH.D., P.E. Copyright National Asphalt Pavement Association [USA, 2010]).

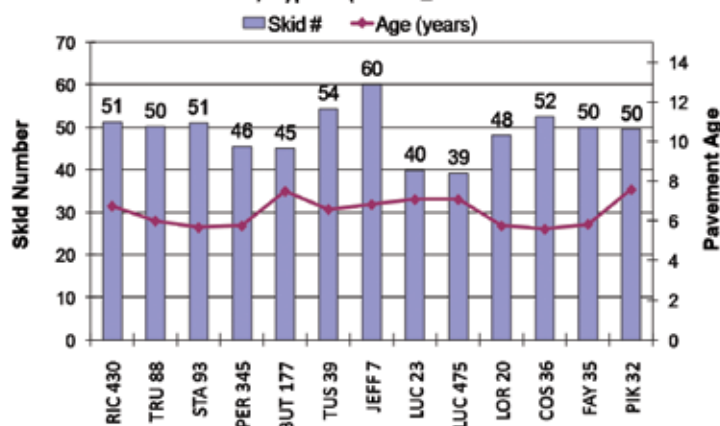
sustainable roadways in the following way:
... Pavement systems that support resource conservation, promote construction safety and leave a light footprint on the natural environment. If there ever were pavements that fit that description it would be those asphalt pavements that have demonstrated perpetual life; that includes 100 percent of all of the deep-strength asphalt pavements on Ohio’s Interstate System. Virgin aggregates saved and asphalt binder sequestered in these asphalt bases result in far lower carbon emissions when compared to other paving systems. A sustainable pavement system, such as that used for Ohio’s asphalt pavements, wherein maintenance involves simple wearing course restoration provides the most efficient use of natural resources; particularly so when you consider that approximately 20 percent of the new wearing course is comprised of Reclaimed Asphalt Pavement (RAP).

Warm Mix Asphalt (WMA), likewise, is a sustainable technology. It reduces fuel consumption, is a cleaner manufacturing process and improves the working environment for paving personnel. Data from ODOT field trials in 2008 validate an approximate 11 percent fuel savings and reductions in NO_x, CO₂ and VOC. WMA technology has been widely accepted in Ohio, and just within the last three years Ohio has seen 44 percent of its asphalt mixing plants be outfitted with WMA production capabilities. As documented by ODOT, WMA has grown within the last three years to approximately 32 percent of all the

as part of a legislated review of the ODOT Pavement Selection Process.

The most substantial data in favor of asphalt pavement is found in the area of Sustainability. I define

2010 Skid Number for Fine-Graded Polymer Asphalt, Item 424, Type B (a.k.a. *Smoothseal*)



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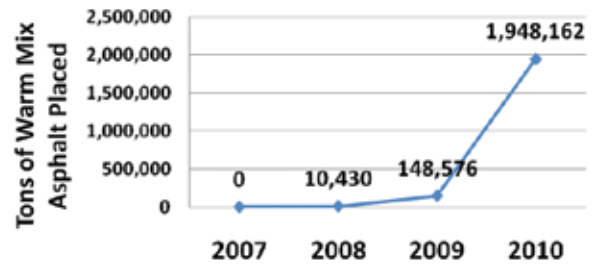
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tonnage purchased by ODOT. In 2010, approximately 1.9 million tons of WMA were produced for ODOT projects – that's more than the WMA hotbed of Alabama, more than New York, and BIGGER than Texas.

The sustainable attributes of asphalt keep on growing. Porous asphalt is a Low Impact Development (LID) stormwater management technology that reduces runoff and, when used to infiltrate stormwater into soil, improves runoff quality. Some day all commercial parking facilities will control stormwater by incorporating porous asphalt; that one's an opinion.

Lest we forget, only asphalt has the reputation for being the most recycled material used in the United States. In 2007, FPO launched a survey of Ohio's asphalt mixture producers. The data indicated that enough old asphalt was being

Warm Mix Asphalt (WMA) Use by the Ohio Department of Transportation



recycled into new pavement to pave a two-lane road from Columbus to Los Angeles; about three million tons of RAP. But now we have FRAP (Fractionated Reclaimed Asphalt Pavement) and RAS (Recycled Asphalt Shingles); both of which are permitted by ODOT specification to further economize on mix cost while ensuring mix quality.

Asphalt truly is Defining Value! It's Safe, Smooth and Sustainable. THE DATA PROVES IT!



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49TH ANNUAL MEETING, EQUIPMENT EXPO & TRADE SHOW

POLARIS VENUE RETURNS EVENT TO MAIN STAR STATUS

A year after it shared its annual meeting stage with the world, Ohio's asphalt industry once again was the main star at Flexible Pavements of Ohio's (FPO) 49th Annual Meeting, Equipment Expo & Trade Show. How appropriate it did so at a venue named Polaris – the Latin word for North Star.

FPO's 2011 Annual Meeting was held March 8-9 for the first time at the Hilton Columbus/Polaris. In previous years the annual meeting's venue was at the nearby Hilton Columbus/Easton, before being held last year concurrently with the 2010 World of Asphalt in Cincinnati.

In showing the best of what Ohio's asphalt industry has to offer in the form of expo and trade show exhibitors, general sessions and quality projects, the FPO Annual Meeting didn't shy away from the limelight – celestially speaking.

The two-day annual meeting began with a Member Breakfast that coincided with a Public Agency Forum presided by Hamilton County Engineer William Brayshaw. The forum provided the audience the chance to participate in an open discussion of asphalt pavement issues and concerns.

Over nearly the next 10 hours, the annual meeting's attendees had the opportunity to participate in two General Sessions, the Awards Luncheon and the evening's Chairman's Reception.



Vince Tutino of Lindy Paving Inc. of New Castle, Pa., addresses the opening day's audience.

EXHIBITORS

The following exhibitors who participated in FPO's 49th Annual Meeting Equipment Expo & Trade Show:

EQUIPMENT EXPO

Columbus Equipment Co.	Southeastern Equipment Co.
The McLean Co.	Murphy Tractor & Equipment Co.
Rudd Equipment Co.	

TRADE SHOW

Asphalt Shingle Grinding Service LLC	Meredith Brothers, Inc.
Astec, Inc.	Murphy Tractor & Equipment Co.
Columbus Equipment Co.	Ohio CAT
Crafco, Inc.	Precision Laser & Instrument Inc.
DJL Material & Supply Inc.	Reliable Asphalt Products, Inc.
GeoShack Ohio LLC	Roadtec
Highway Rubber Products Corp.	Rudd Equipment Co.
Maxam Equipment, Inc.	Seneca Petroleum Co.

The first general session featured the topic of Providing Value, as Lindy Paving's Vince Tutino spoke on the subject of "Delivering Quality Construction." Tutino knows what he speaks of, as Lindy Paving has been awarded the National Asphalt Pavement Association's (NAPA) highest honor, the Sheldon G. Hayes Award, three consecutive years. The second portion of the session was led by Harold Mullen, of the Texas Asphalt Pavement Association (TexAPA), who commented on "Embracing a Quality Culture." Mullen discussed quality and innovation and how Texas and TexAPA have developed the Partners in Quality program.

The annual Awards Luncheon was next on the docket, as 39 asphalt projects were honored for their quality craftsmanship and long-time service to Ohio's traveling public. (See page 12 for descriptions and photos of award-winning projects and individuals.)

Appropriately following the Awards Luncheon was the second general session "Advancing the Message." The session featured presentations by NAPA Vice President Mike Kvach, who spoke on why it makes good "cents" for pavement owners to invest in asphalt, and Erie Blacktop's Ed Ebner, who spoke on "Selling Today's Asphalt." Ebner's presentation provided real-world examples of how contractors can effectively promote and market asphalt to pavement owners.



ODOT Director Jerry Wray addresses the audience during Wednesday morning's Prayer Breakfast.

Tuesday's scheduled activities concluded with the Chairman's Reception, followed by the

opportunity for attendees to continue the evening at Polaris-area restaurants and other establishments in northern Columbus.

The meeting's final day included the traditional Prayer Breakfast, the third general session and the continuation of the Annual Meeting's Expo & Trade Show.

In what morning keynote speaker Jerry Wray called "a wonderful tradition for FPO," Pastor Paul Burgett, of the Harvest Chapel Church of Christ in Christian Union, provided a timely Ash Wednesday message for the Prayer Breakfast audience. Wray, the first person to serve as Ohio Department of Transportation (ODOT) director two times in the department's more than 100-year history, is very familiar with the FPO's Annual Meeting breakfast event. The former Licking County deputy engineer and engineer, who previously led ODOT from 1991-99 was the 2007 recipient of FPO's highest honor, the William W. Baker Award for leadership and quality.

While Pastor Burgett spoke from the scriptures in his message, Wray looked to history during his presentation. Wray said that 400 years ago, renowned writer, philosopher and statesman Sir Francis Bacon was asked:



The 49th Annual Meeting, Equipment Expo & Trade Show featured (top) 16 booths for attendees to see and learn more about current industry technology and (bottom) more than six hours of General Session seminars.



FPO President & Executive Director Cliff Ursich encourages members to catch the vision that a greater market comes through providing greater value to our customers.

“What is the single key to greatness of a nation? His response,” Wray said, “was ‘easy conveyance of men and goods from place to place.’” Wray added that with all the terms in transportation today, such as “connectivity,” “seamless,” “multi-modal,” etc., for him, Bacon’s words catch the essence of both his and the audiences’ professional duties the best.

Wray, who discussed ODOT’s biennial budget, the federal transportation bill reauthorization and the new ODOT Director’s Taskforce, connected with the audience when he said that pavement is ODOT’s core tangible product. “We design it; say where it’s going to go; construct it and maintain it; we stripe it; we put signs beside it and maintain the signs over it; we clean the snow and ice off it; we build bridges so we can get across the water. Our core tangible product is pavement,” he said.

Following Wray’s address, FPO’s 2011-2012 scholarship winners were announced. This year a total of nearly \$31,000 will be awarded to 25 students currently attending five Ohio universities that provide course work in hot mix asphalt. Also announced was Larry Palmer, the recipient of the 2011 Ohio Asphalt Industry Award, and Dr. Shad Sargand, who was honored with the FPO’s highest individual honor, the William “Bill” Baker Award. (See pages 23 and 24 for more information on the individual award honorees.)



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The final event of the 2011 annual meeting was the third general session, which was on the subject of "Defining Value." The audience heard presentations from Cuyahoga County Design Engineer Brian Driscoll, Muskingum County Engineer Doug Davis and ODOT's Dave Powers, as the three pavement owner representatives provided their insight on what urban and rural county engineers and the state DOT value the most in their paving projects.



Through informative programs, speakers, displays and equipment, such as the ones at this year's FPO Annual Meeting Equipment Expo & Trade Show, the association will continue being the guiding light for Ohio's asphalt industry — just like the North Star.

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49TH ANNUAL AWARDS CEREMONY

From new roadways to full-depth reconstruction and resurfacing projects on highly traveled Interstates, U.S. and state routes, to local streets, bike paths, boat launches, airport runways and parking lots, the Awards Ceremony at FPO's 49th Annual Meeting, Equipment Expo & Trade Show covers the spectrum of quality asphalt pavement.

Tuesday's luncheon on the opening day of the 2011 FPO Annual Meeting at the Hilton Columbus/Polaris provided the stage to recognize 39 projects, with their respective paving contracting companies, crews and pavement owners recognized for their achievement in quality asphalt construction. The Awards Ceremony also provided an opportunity to honor long-time service, from asphalt pavements which have stood the test of time to individuals recognized as recipients of the Industry Service and William W. "Bill" Baker awards.

MASTER CRAFTSMAN AWARD

Established to recognize pavement projects that withstand time, heavy-use and environmental conditions, the Master Craftsman Award honors projects demonstrating durability of asphalt paving and low-maintenance costs over the life of the pavement. Qualifying projects must have provided a minimum of 15 years of service with only light maintenance. This year's Master Craftsman Award was presented for:

KINGS ISLAND DRIVE, CITY OF MASON, CITY OF MASON
PAVING CONTRACTOR: JOHN R. JURGENSEN CO.

Originally constructed in 1972, Kings Island Drive is a high-traffic business area serving more than 17,500 vehicles daily. Exemplary work by paving contractor John R. Jurgensen Co. provided a quality pavement that has only needed resurfaced twice in more than 38 years of service — in 1995 and most recently in 2010 — earning the John R. Jurgensen Company a 2010 Quality Asphalt Paving Award in addition to the Master Craftsman Award.

Doug Jamos accepted the honor on behalf of the John R. Jurgensen, Co.

The recipients of Quality Asphalt Paving Awards for projects completed in 2010, received plaques and "Q" for quality medallions and stickers to be displayed on their company equipment and work crews' hardhats. Congratulating the honored companies were FPO Chairman Jim Jurgensen and ODOT Assistant Director and Chief Engineer Jim Barna.

ODOT PAVEMENTS

**RESURFACING OF S.R. 109 BETWEEN HENRY/FULTON COUNTY ROAD A
AND FULTON COUNTY ROAD D, ODOT DISTRICT 2**
PAVING CONTRACTOR: THE SHELLEY CO.

Noted for its excellent, uniform mat texture and overall completeness, The Shelly Co. resurfaced more than three miles of S.R. 109 using warm mix asphalt (WMA).

Accepting the award was Byron Clymer of The Shelly Co.



49TH ANNUAL AWARDS CEREMONY

**RESURFACING OF S.R. 6 FROM S.R. 2 WEST TO ERIE COUNTY LINE;
RESURFACING OF S.R. 269 FROM S.R. 6 NORTH TO S.R. 2,
ODOT DISTRICT 3
PAVING CONTRACTOR: ERIE BLACKTOP INC.**

Erie Blacktop provided milling of the existing pavement, shoulder repair and resurfacing on the project, which was noted for a consistent uniform mat texture and high level of overall completeness.

Randy Wikel accepted the award on behalf of Erie Blacktop.



**SMOOTHSEALING OF U.S. 422 IN TRUMBULL COUNTY,
ODOT DISTRICT 4
PAVING CONTRACTOR: THE SHELLEY CO.**

The Smoothseal resurfacing of U.S. 422 by The Shelly Co. was noted for its superior ride quality. Because of traffic, the work conditions on the project had a high level of difficulty.

Accepting the award was Ken Brogley on behalf of The Shelly Co.



**RELOCATION OF S.R. 161/37 BETWEEN WATKINS ROAD & S.R. 16,
ODOT DISTRICT 5
PAVING CONTRACTOR: KOKOSING CONSTRUCTION CO.**

The \$50-million relocation project, which resulted in nearly six miles of new four-lane divided roadway, featured more than 210,000 tons of asphalt pavement. To earn the project's smoothness incentive, Kokosing Construction used a material transfer device on the surface and intermediate courses. The project's craftsmanship was recognized with a 2010 NAPA Quality in Construction Award.

Accepting the award were Scott Harris (left) of Kokosing Construction and Keith Geiger of ODOT District 5.



**RESURFACING OF I-70 IN MUSKINGUM COUNTY,
ODOT DISTRICT 5
PAVING CONTRACTOR: SHELLEY & SANDS INC.**

The \$7-million, four-lane resurfacing of this high-traffic corridor called for Shelly & Sands to place more than 80,000 tons of asphalt.

Accepting the award were Shane Novaria (left) of Shelly & Sands and Keith Geiger of ODOT District 5.



49TH ANNUAL AWARDS CEREMONY

RESURFACING OF I-70 IN LICKING COUNTY, ODOT DISTRICT 5 PAVING CONTRACTOR: THE SHELLEY CO.

The project, which included four-lane resurfacing with bridge deck repairs, called for a heavy-design pavement and included density and smoothness specifications. As a result of the project's low IRI rating, The Shelly Co. received a bonus for pavement smoothness.

Tim Anderson (left) and Richie Boring of The Shelly Co. and Keith Geiger of ODOT District 5 accept the award.



RESURFACING OF SECOND STREET IN THE CITY OF COSHOCTON, ODOT DISTRICT 5 PAVING CONTRACTOR: THE SHELLEY CO.

The Shelly Co. performed the two-lane resurfacing, spot pavement repair and installation of curbs and gutters for approximately two miles of Second Street in Coshocton.

The Shelly Co.'s (from left) Scott Cooperrider, Jeff McCormick and Dave Gentil and ODOT District 5's Keith Geiger (second left) accept the project's Quality Award.



RESURFACING OF S.R. 315 FROM GOODALE AVENUE TO ACKERMAN ROAD IN FRANKLIN COUNTY, ODOT DISTRICT 6 PAVING CONTRACTOR: THE SHELLEY CO.

The resurfacing of this high-traffic corridor, which is a major north-south thoroughfare in Columbus adjacent The Ohio State University campus, spanned two construction seasons due to the project's tight night paving schedule. Utilizing 60,000 tons of asphalt, The Shelly Co. earned 99 percent of the smoothness bonus and 98.5 of the density bonus. This project was also recognized as a 2010 NAPA Quality in Construction Award project.

Adam Fosbee (left) and Jim Pritchard of The Shelly Co. and Lisa Zigmund of ODOT District 6 accept the award.



49TH ANNUAL AWARDS CEREMONY

RESURFACING OF S.R. 292 FROM S.R. 47 TO THE VILLAGE OF RIDGEWAY IN LOGAN COUNTY, ODOT DISTRICT 7 PAVING CONTRACTOR: THE SHELLEY CO.

The Shelly Co. placed more than 9,500 tons of asphalt in the milling, resurfacing and miscellaneous bridge repair along two lanes of S.R. 292 in the Village of Ridgeway.

The Shelly Co.'s Lyle Dible accepts the award.



RESURFACING OF S.R. 177 FROM THE BUTLER COUNTY LINE TO THE STATE OF INDIANA, ODOT DISTRICT 8 PAVING CONTRACTOR: BARRETT PAVING MATERIALS INC.

Noted for its attractive appearance and smooth ride, Barrett Paving Materials placed nearly 30,000 tons of asphalt in performing nearly 10 miles of two-lane milling and resurfacing work.

Barrett Paving Materials' Jeff Sebring (left) and Jay Shawver and ODOT District 8's Steve Mary accept the award.



RESURFACING OF U.S. 127 NORTH OF I-275 IN HAMILTON COUNTY, ODOT DISTRICT 8 PAVING CONTRACTOR: JOHN R. JURGENSEN CO.

A 2010 NAPA Quality in Construction Award winner, this project required the John R. Jurgensen Co. to use nearly 10,000 tons of asphalt in resurfacing a one-mile stretch of U.S. 127. The result of this project, located in a high-traffic, commercial area, is a quality pavement noted for its good looking texture.

Accepting the award were John R. Jurgensen Co.'s Paul Cain and Brian Jones and ODOT District 8's Steve Mary (center).



RESURFACING U.S. 22 FROM BUXTON AVE. TO CYPRESS WAY IN THE CITY OF NORWOOD, ODOT DISTRICT 8 PAVING CONTRACTOR: JOHN R. JURGENSEN CO.

Utilizing more than 3,400 tons of asphalt on the project, John R. Jurgensen Co. met the challenges of maintenance of traffic and coordination of construction with local businesses to successfully provide milling and full-depth repair on this urban two-lane roadway in Norwood.

Brian Jones (left) and Paul Cain (right) of John R. Jurgensen Co. and Steve Mary of ODOT 8 accept the honor.



49TH ANNUAL AWARDS CEREMONY

RESURFACING OF U.S. 52 IN SCIOTO COUNTY, ODOT DISTRICT 9 PAVING CONTRACTOR: THE SHELLY CO.

The Shelly Co. placed more than 14,000 tons of asphalt on this seven-mile-long two-lane resurfacing project of U.S. 52 in Nile and Washington townships. The project was noted for its density and excellent joint construction.

Accepting the award were Roger Strouse and Thomas K.H. Lambert from The Shelly Co.



RESURFACING OF S.R. 32 IN ADAMS COUNTY, ODOT DISTRICT 9 PAVING CONTRACTOR: THE SHELLY CO.

The Shelly Co. placed approximately 35,000 tons of asphalt on this 13-mile, four-lane American Recovery & Restoration Act (ARRA) resurfacing project.

Tim Anderson (left) and Richie Boring accept the award on behalf of The Shelly Co.



RESURFACING OF U.S. 36 IN TUSCARAWAS COUNTY, ODOT DISTRICT 11 PAVING CONTRACTOR: SHELLY & SANDS INC.

In the resurfacing of U.S. 36, just east of I-77, Shelly & Sands used WMA, which resulted in a very good ride quality and joint construction.

Accepting the honor were Shelly & Sands' Jim Hamm (left) and ODOT District 11's Christine Murgida.



RESURFACING OF I-271 EXPRESS LANES IN CUYAHOGA COUNTY, ODOT DISTRICT 12 PAVING CONTRACTOR: KOKOSING CONSTRUCTION CO.

In the paving of the I-271 express lanes' mainline lanes and 10-foot shoulders, Kokosing Construction achieved superior surface texture due to the use of multiple pavers and a temperature recording device. Simultaneously using 24- and 10-foot-wide pavers on the mainline and outside shoulder, the contractor produced superior joint construction. The use of a continuous mat temperature recording device during the night paving operations, which provided immediate information on asphalt temperatures, added to the project's overall craftsmanship.

Accepting the honor on behalf of Kokosing Construction were (from left) Matt Culler, Bryan Thorne and Mike Watson.



49TH ANNUAL AWARDS CEREMONY

SMOOTHSEALING OF I-90 IN CUYAHOGA COUNTY, ODOT DISTRICT 12 PAVING CONTRACTOR: BURTON SCOT CONTRACTORS

In removing and resurfacing of one inch of pavement on I-90, Burton Scot Contractors used 85,000 tons of 424 Type B, Smoothseal to achieve superior ride quality and smoothness.

Burton Scot Contractor's Tim Blackley accepted the award.



LOCAL ROAD OR STREET

RESURFACING OF MALL ROAD AND BANFIELD ROAD IN THE CITY OF ST. CLAIRSVILLE, BELMONT COUNTY ENGINEER PAVING CONTRACTOR: SHELLY & SANDS INC.

Shelly & Sands placed nearly 4,000 tons of asphalt during a one-mile-long milling and resurfacing of Mall and Banfield roads.

Accepting the award were Belmont County Engineer Fred Bennett (left) and Shelly & Sands' Ed Leonard.



RECONSTRUCTION OF NORTH SANDUSKY STREET IN THE CITY OF BUCYRUS PAVING CONTRACTOR: KOKOSING CONSTRUCTION CO.

Kokosing successfully placed more than 9,000 tons of asphalt in the three-course paving and complete reconstruction of a nine block section of North Sandusky in downtown Bucyrus.

Rickie N. Kessler accepts the award on behalf of Kokosing Construction.



PAVING OF GORGE PARKWAY, CLEVELAND METROPARKS PAVING CONTRACTOR: KARVO PAVING CO.

Karvo Paving's work on Gorge Parkway for Cleveland Metroparks can be described as being pretty as a picture. The project, noted for its uniform mat texture, joint construction and high level of overall completeness, was featured on the cover of the Fall 2010 issue of *Ohio Asphalt*.

Karvo Paving's George Karvounides (left) and Dave Weightman accepted the award.



49TH ANNUAL AWARDS CEREMONY

SMOOTHSEALING OF WASHINGTON STREET, VILLAGE OF CANAL WINCHESTER PAVING CONTRACTOR: DECKER CONSTRUCTION CO.

Decker Construction placed 610 tons of Smoothseal in a one-inch overlay of Washington Street in the Village of Canal Winchester. The project included spot pavement repair, edge and profile milling and the use of trackless tack. Decker Construction's use of Smoothseal on the project was one of the first times this application was used on a local pavement in Central Ohio.

The award was accepted by Decker Construction's Jonathon Apple (left) and QCI's Mark Schneider.



RESURFACING OF USHER ROAD FROM SPRAGUE ROAD TO BAGLEY ROAD IN OL MSTED TOWNSHIP AND THE CITY OF OL MSTED FALLS, CUYAHOGA COUNTY ENGINEER PAVING CONTRACTOR: BURTON SCOT CONTRACTORS

Burton Scot Contractor's work on Usher Road in Olmsted Township and the City of Olmsted Falls received high marks for gradation control and density. The project included the removal and replacement of nearly two-miles of roadway pavement, base repairs, variable widening and other associated work. The project required Burton Scot Contractors to use 6,000 tons of WMA, which featured The Shelly Company's Eco-Mix.

Accepting the honor were Bob Klaiber and Brian Driscoll from Cuyahoga County and Burton Scot Contractors' Ron Blair (center).



RESURFACING NORTH ST. CLAIR STREET FROM 5TH STREET TO MONUMENT AVENUE, CITY OF DAYTON PAVING CONTRACTOR: JOHN R. JURGENSEN CO.

Part of a larger citywide resurfacing project completed by the John R. Jurgensen Co., this portion of North St. Clair Street in the City of Dayton was selected for review because it was representative of the overall project and was especially challenging because of its high-traffic location, parking and businesses.

Pete Flora (left) of John R. Jurgensen Co. and Dave Weinandy of the City of Dayton accepted the award.



49TH ANNUAL AWARDS CEREMONY

RESURFACING OF CUSHING DRIVE, CITY OF KETTERING PAVING CONTRACTOR: JOHN R. JURGENSEN CO.

Another larger citywide resurfacing program completed by John R. Jurgensen Co., this portion of the City of Kettering's Cushing Drive was noted for having superior ride quality and as a good example of a subdivision street pavement.

City of Kettering's Chad Ingle and John R. Jurgensen Co.'s Hutch Rogge accepted the honor.



RESURFACING OF SYLVANIA-METAMORA ROAD, LUCAS COUNTY ENGINEER PAVING CONTRACTOR: GERKEN PAVING INC.

Gerken Paving's storm sewer replacement and one-mile resurfacing on Sylvania-Metamora Road had exceptional uniformity and superior joint construction.

Lucas County Engineer's Josh Hazard and Gerken Paving Inc.'s Rick Zibbel accepted the award.



404LVT RESURFACING OF MILLERS LANE FROM S.R. 60 TO CLAY PIKE, MUSKINGUM COUNTY ENGINEER PAVING CONTRACTOR: SHELLY & SANDS INC.

The first 404LVT (Low Volume Traffic) project to earn a Quality Asphalt Paving Award, Shelly & Sands used more than 10,000 tons of 404LVT in placing a one-inch-thick course on Millers Lane. This project was featured on the cover of the Winter/Spring 2011 issue of *Ohio Asphalt*.

The award was accepted by Shelly & Sands' Neil Prouty and Muskingum County Engineer Doug Davis.



RESURFACING OF OTTER CREEK ROAD/BAYSHORE ROAD BETWEEN CORDUROY ROAD & WYNN ROAD, CITY OF OREGON PAVING CONTRACTOR: THE SHELLEY CO.

This WMA project required The Shelly Co. to perform a variety of construction, such as full-depth asphalt, rubblization of existing concrete pavement, milling with full-depth concrete base repair and overlay and asphalt milling. The project was noted for not only the complexity but also the quality work at a railroad crossing and intersections.

Ross McLaughlin from the Shelly Co. and the City of Oregon's Rodney Shultz accepted the award.



49TH ANNUAL AWARDS CEREMONY

RESURFACING OF HAYES AVENUE FROM PERKINS AVENUE NORTH TO COLUMBUS AVENUE, CITY OF SANDUSKY PAVING CONTRACTOR: ERIE BLACKTOP INC.

Erie Blacktop was noted for providing Sandusky's Hayes Avenue with superior joint construction and overall high-ride quality despite having to perform the resurfacing work in the midst of substantial traffic.

Ned Wikel accepted the award on behalf of Erie Blacktop.



WASHINGTON ROAD BERM STABILIZATION AND TWO-INCH OVERLAY, MIAMI COUNTY ENGINEER PAVING CONTRACTOR: JOHN R. JURGENSEN CO.

John R. Jurgensen Co. performed two inches of resurfacing and berm stabilization on this ARRA-funded project near Troy. Work on the main arterial met federal Local Public Agency (LPA) standards for design and construction.

Pete Flora accepts the award for John R. Jurgensen Co.



SPECIAL-USE PAVEMENTS

CONSTRUCTION OF BIKE PATH UNDER I-280 FROM FRONT AND SUMMIT STREETS SOUTH TO THE GREENBELT PARKWAY, LUCAS COUNTY, ODOT DISTRICT 2 PAVING CONTRACTOR: THE SHELLEY CO.

The Shelly Co. constructed this multi-stage bikeway over a span of three construction seasons as part of the I-280 Maumee River Crossing Project in Lucas County. The bike path's pavement was noted for its uniform texture.

The Shelly Co.'s Ross McLaughlin accepted the honor.



PAVING OF HURON RIVER BOAT LAUNCH FACILITY AND PARKING AREA, CITY OF HURON PAVING CONTRACTOR: ERIE BLACKTOP INC.

Thanks to Erie Blacktop, the Huron River Boat Launch Facility and parking area's asphalt pavement in Huron was noted for its uniform mat, well-knit joints and great craftsmanship.

Bob Boehk accepts the award on behalf of Erie Blacktop.



49TH ANNUAL AWARDS CEREMONY

CONSTRUCTION OF POROUS ASPHALT PARKING LOT AT TALLMADGE MEADOWS AREA IN MUNROE FALLS METRO PARK, METRO PARKS SERVING SUMMIT COUNTY

PAVING CONTRACTOR: PERRIN ASPHALT

Perrin Asphalt not only has the honor of being a Special-Use Pavement Quality Paving Award recipient, it also has the honor of having its parking lot construction in Summit County's Munroe Falls Metro Park recognized as the first porous asphalt project to be recognized as a Quality Paving Award winner.

Accepting the award were Perrin Asphalt's Kim Hengle and Chuck Perrin.



COMMERCIAL PARKING FACILITY

RESURFACING OF OHIO CASUALTY/LIBERTY MUTUAL PARKING LOT, LIBERTY MUTUAL

PAVING CONTRACTOR: JOHN R. JURGENSEN CO.

The John R. Jurgensen Co. overcame the challenges of completing the WMA parking facility resurfacing project in phases because of owner constraints. The finished product provided Ohio Casualty/Liberty Mutual with quality results.

Jerry Hopkins accepted the award on behalf of the John R. Jurgensen Co.



PAVING OF U.S. ARMY RESERVE CENTER PARKING LOT & DRIVEWAY IN THE VILLAGE OF MILAN, U.S. ARMY CORPS OF ENGINEERS

PAVING CONTRACTOR: ERIE BLACKTOP INC.

Erie Blacktop was noted for providing very good craftsmanship and an excellent project in its paving of the main access driveway and multiple parking areas for the U.S. Army Reserve Center in Milan.

The award was accepted by Randy Shaffer of Erie Blacktop Inc.



CONSTRUCTION OF NEW PARKING LOT FOR THE HOME DEPOT DISTRIBUTION CENTER IN HANCOCK COUNTY, CATAMOUNT CONTRACTORS INC.

PAVING CONTRACTOR: THE SHELLEY CO.

The Shelly Co. placed 36,400 tons of asphalt in the construction of a new parking lot for The Home Depot Distribution Center. The commercial parking facility, which features various pavement buildups to accommodate heavy-duty trucks and passenger cars, was noted for its uniform texture.

The Shelly Co.'s Ken Fern accepted the award.



49TH ANNUAL AWARDS CEREMONY

AIRPORT PAVEMENT

**RICKENBACKER INTERNATIONAL AIRPORT RUNWAY 5R-23L PAVEMENT REHABILITATION, COLUMBUS REGIONAL AIRPORT AUTHORITY
PAVING CONTRACTOR: THE SHELLEY CO.**

The Shelly Co. followed up the award-winning project's first phase with an award-winning second phase. The Rickenbacker International Airport Runway pavement rehabilitation project's second phase required The Shelly Co. to remove 9-inches of a concrete runway and replace it with more than 23,000 tons of asphalt. In meeting Federal Aviation Administration (FAA) specifications, The Shelly Co. met stringent grade and smoothness requirements by utilizing a Material Transfer Device, a paver with a 25-foot screed and surveyors to ensure grade met specifications. The airport runway rehabilitation project was also the recipient of a 2009 Quality Paving Award, and both project phases were honored with a 2010 NAPA Quality in Construction Award.

Dave Scott and Jim Pritchard accept the award on behalf of The Shelly Co.



**GEAUGA COUNTY AIRPORT RUNWAY RESURFACING PROJECT, GEAUGA COUNTY AIRPORT
PAVING CONTRACTOR: KOKOSING CONSTRUCTION CO.**

Paving contractors yearn for project owner comments such as “wonderful to work with,” “runway is smooth as glass,” and “pilots love it.” These and other compliments are what Kokosing Construction received for its runway resurfacing work at the Geauga County Airport. Kokosing earned the kudos by milling 1.25 inches of the runway and resurfacing it with more than 4,000 tons of asphalt.

Kokosing Construction's Darrel Gilles and Tom Roland accepted the award.



**THE OHIO STATE UNIVERSITY AIRPORT RUNWAY 9R-27L REHABILITATION,
THE OHIO STATE UNIVERSITY AIRPORT
PAVING CONTRACTOR: SHELLEY & SANDS INC.**

Also a 2010 NAPA Quality in Construction Award winner, this project consisted of the milling and base stabilization of the existing one-mile-long runway and resurfacing of The Ohio State University Airport runway with 34,000 tons of asphalt. Shelly & Sands achieved superior joint construction, well-knit pavement and good alignment on the runway, as well as met strict FAA grade and elevation requirements by using a 25-foot paving screed. Shelly & Sands achieved project quality by paving a continuous one-mile pass for eight consecutive days.

The honor was accepted by (from left) Shelly & Sands' Ed Rouan and Neil Prouty, OSU Airport's Dale Gelter and Resource International's Jim Gregory.



49TH ANNUAL AWARDS CEREMONY

INDIVIDUAL AWARDS

RETIRING CHAIRMAN OF THE BOARD

Jim Jurgensen of Valley Asphalt Corp. was recognized for his service as FPO's 2010 chairman of the board during the Membership Breakfast at the 49th Annual Meeting. Jurgensen served as chairman during a challenging time for the industry and his tenure included initiatives to improve the quality of asphalt construction and renewed marketing and industry advocacy efforts.



FPO President & Executive Director Cliff Ursich (right) presents outgoing Chairman of the Board Jim Jurgensen with a plaque commemorating his service.

In honoring Jurgensen, FPO's President & Executive Director Cliff Ursich said, "Jim is a tireless advocate of Ohio's asphalt industry. His dedication and service as chairman of the board during this past year was a tremendous asset to both the industry and the association, and I look forward to his continued leadership as a member of the board of directors."

RETIRING BOARD MEMBER

Rob Sharrett of The Shelly Co. was honored as a retiring member of the board of directors. Most recently, Sharrett served as co-chairman of the board of directors and as the chairman of the Annual Meeting Planning Committee.

As committee chairman, Sharrett oversaw the transition of the Annual Meeting to the new venue of the Hilton Columbus/Polaris. "Rob was devoted to the asphalt industry and the association," Ursich said. "His leadership during the difficult change in meeting locations helped to make this event a success."

INDUSTRY SERVICE AWARD

Not only has Larry Palmer worked in the industry for more than 46 years, his promotion and marketing of asphalt has helped make it the quality pavement now found on 98 percent of Ohio's roadways. What better credentials do you need to receive FPO's Industry Service Award?

The Industry Service Award was established by the FPO Board of Directors to recognize individuals who have made a substantial contribution to the association and Ohio's paving industry.

A district sales manager for Seneca Petroleum Co. since 1974, Palmer is a long-time advocate of the asphalt industry. He has been a member of FPO's Marketing and Promotion Committee since 1989.

Because of Palmer's knowledge of the asphalt market, he urged development of two new asphalt mixtures that today are commonplace in the industry. He saw an opportunity of a thin-lift asphalt mixture in the preventive maintenance market – which is known today as Smoothseal. Palmer also advocated the use of polymers in mixes, such as MAC20-HD (modified AC20-heavy duty). Polymers in asphalt, known early on as Seal-o-flex, proved to improve its performance in very heavy traffic areas. Palmer's promoting of Seal-o-flex has made polymer modification a staple of Ohio's roadway construction.

2011 marks the 50th year since Palmer began working in the asphalt industry, an industry he has all but dedicated his life to except for his years serving in the U.S. Army and as a contractor's grade foreman. He began working in the asphalt business on a paving crew as a college student over the summer break with B&G Bituminous Co. Following his military services and work with B.G. Danis, he was named plant manager for Koppers Co.-Highway Emulsion Division. In 1971, Palmer discovered more of the marketing side to the asphalt business when he became regional sales manager for Central Oil Asphalt Corp. In October of 1974, he became district sales manager for Seneca Petroleum Co., covering Ohio and Michigan. He continues in that capacity to this day.



Larry Palmer is presented the Industry Service Award, honoring his 46 years of promotion and marketing of asphalt.

WILLIAM W. "BILL" BAKER AWARD

As a faculty member of the Department of Civil Engineering at Ohio University's Russ College of Engineering and Technology, Dr. Shad Sargand loves tests.

Sargand's work on the Ohio Strategic Highway Research Program National Test Road



Dr. Shad Sargand is presented with the association's highest honor, the William W. "Bill" Baker Award.

49TH ANNUAL AWARDS CEREMONY

and other Ohio test sites for Perpetual Pavement thickness design and Warm Mix Asphalt (WMA) only skim the surface of his dedication to asphalt research, strong advocacy for asphalt pavement construction and his pursuit to improve Ohio's roadway system. These traits and his many accomplishments in his 35-year professional career earned Sargand the 2011 William W. "Bill" Baker Award.

Esteemed as FPO's highest award, the honor is named after the association's former president, who presided from 1976-1991.

Sargand began his career as a structural engineer in 1976. His thirst for knowledge propelled him to continue his education by obtaining a master's degree in civil engineering from the University of Nebraska and a doctorate degree in geotechnical engineering from Virginia Polytechnic Institute (VPI). VPI, ironically, is also where Baker received his civil engineering degree. Following his degree from VPI, Sargand joined the faculty at O.U.'s Russ College of Engineering and Technology.

Since 1995, and the inception of the Ohio Test Road on U.S. Route 23 in Delaware County, Sargand has served as its lead researcher. He also

led and conducted test road efforts with Perpetual Pavement thickness design on U.S. 30 in Wayne County and WMA in Guernsey County. His aforementioned research and his work at O.U.'s Accelerated Pavement Load Facility in Lancaster have helped him author more than 150 journal articles, conference papers and technical reports. And his vision for pavement research led to him recently being the founder of the National Asphalt Laboratory in Lancaster that promises to advance asphalt technology.

In announcing Sargand as the 2011 William Baker Award winner, Ursich said, "I can testify that our recipient has been a very strong advocate for asphalt pavement construction; recognizing the advantages that deep-strength asphalt pavements provide in long-term performance. He is tireless in his pursuit of research to improve Ohio's roadway system . . .

"Dr. Sargand is deserving of this award because of his enduring commitment to research and implementation of quality asphalt pavement design and construction, for his effectiveness as a leader in Ohio's asphalt research community and his accomplishments in ensuring lasting improvements to Ohio's roadway system."



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WIN THE WAR ON CRACKS, PART IV



JAMES A. SCHEROCMAN, P.E.
Consulting Engineer



VIC ROBERTS, P.E.
Vice President
R.B. Jergens Contractors

(Editor's note: This is the fourth of a series of articles appearing in Ohio Asphalt intended to give pavement owners and engineers the knowledge needed to ensure their asphalt pavement designs result in successful performance. Part I of the series, "War on Cracks," appeared in the Summer/Fall 2009 issue; Part II, "Low Strain, Long-Life Pavements," appeared in the Fall/Winter 2009 issue; and "Win the War on Cracks – Part III," appeared in the Summer 2010 issue.)



Fatigue cracking – a sign of insufficient pavement strength.

It's time to target fatigue cracking. So far, this series has primarily focused on the subterranean battlefield – the ongoing war below every pavement. That's where cracks start when teeming tensile forces exceed a pavement's strength and stretch. Cracks open and begin moving from bottom to top. But unfortunately, when cracks claw their way to the surface, people tend to blame the product on top. But top-tactic blame won't win the war. Top blame is upside-down.

WHEN DO ASPHALT PAVEMENTS FATIGUE CRACK?

Winning the war requires stopping fatigue cracking. Asphalt-base pavements are much better than aggregate bases for arresting cracks. Why? Tensile forces build and focus on the pavement's bottom like a laser beam. And aggregate bases cannot resist these forces because the aggregate's particles are not bound together. Tensile forces tear the unbound particles apart during this nasty tug-of-war. Asphalt base, however, in stark contrast to an aggregate base, can resist tearing tensile forces because the particles are glued together.

Ohio Department of Transportation (ODOT) Item 304 aggregate base isn't free-draining. So in the wet spring, the aggregate particles are lubricated and move under applied traffic loads allowing pavements to deflect. But asphalt-base armor can keep strain well below the cracking threshold. Compare the big performance difference between an unbound aggregate base and a glued-together asphalt base during wet spring periods. No contest.

STRUCTURAL NUMBER CONCEPT

Structural Numbers and Structural Coefficients go together like a hand in a glove. The Structural Number is a measure of the minimum pavement design strength needed. And Structural Coefficients are a measure of the strength contribution per inch thickness of the individual material layers used in the pavement. You'll see that asphalt base pavements have (at least) 2 ½ times the strength of aggregate bases. Yet during the wet springtime, asphalt's relative strength is even higher when compared to a saturated aggregate base.



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Previous Win the War articles emphasize that soil sub grades must reliably support both the pavement and construction equipment. No pavement is better than its foundation. If soil is deflecting, or “pumping” under construction equipment — then fix the soft soil — don’t cover it up. Placing geotextiles on top of soft subgrade won’t fix the root problem, as proper subsurface drainage and stabilization is required to:

1. Support heavy-construction equipment
2. Support heavy traffic
3. Prevent fatigue cracking

A soft subgrade deflects just like bed springs. Eliminating soft subgrade is both a design phase and a construction phase requirement.

Yet, selecting the pavement’s cross section is purely a design-phase function. Both public agencies and design engineers must select layer types and thicknesses. Often, the selection process is prescriptive and set in stone. For example, local agencies routinely “pre-engineer” pavement sections by road class (e.g. local street, collector or major artery). These prescriptive sections, however, frequently lack enough armor to defeat applied traffic loads and fatigue cracking.

But if you want to win the war, it’s time to re-fit your armor. Let’s get started.

THE ODOT PAVEMENT DESIGN METHOD

ODOT uses a classical design method that is similar to the American Association of State Highway and Transportation Officials’ (AASHTO) method. But there are a few differences. For example, AASHTO’s method uses a layer design analysis to assure that the asphalt layer thickness is sufficient to resist tensile forces at the bottom of each layer. ODOT doesn’t need to consider this procedure because the agency uses thick asphalt sections over a thin aggregate base layer. But local agencies that specify just two asphalt layers, totaling 5 inches, for example, may fail AASHTO’s layer-analysis test. Three asphalt layers are needed to win the war and fight fatigue cracking. AASHTO’s layer analysis test bridles this problem.

Also, a new, emerging design method called Mechanistic Empirical Pavement Design Guide (MEPDG) is currently being evaluated by

pavement engineers. MEPDG aims to calibrate local materials and climate. It also factors traffic loads differently by using Load Spectra instead of the classical Equivalent Single Axle Loads (ESALs). An ESAL, by the way, is a means of normalizing truck axle weights for the purpose of determining how thick a pavement needs to be. One ESAL equates to 18,000 pounds loaded on a single axle, but since classical methods use fundamental concepts that are central to our topic we’ll stick to the classics.

Finally, the Average Daily Traffic (ADT) volume is converted to just truck volume (ADTT). For an asphalt pavement, one 18-wheeler weighing 80,000 pounds creates the same damage as 6,250 cars weighing 4,000 pounds. Since automobiles have a negligible impact on pavement deterioration they are typically ignored. Knowing the percent of automobiles and trucks using a pavement, truck-traffic volume is then converted to ESALs.

CALCULATE THE STRUCTURAL NUMBER FIRST

The objective is to calculate a minimum Structural Number that provides good service life and low bottom strain. Once the required Structural Number is known, the designer simply picks enough armor using Structural Coefficients assigned to each material. The Structural Number is based upon several inputs; the two inputs having the greatest impact on pavement thickness are:

1. Traffic loading, expressed as ESALs
2. Subgrade strength, expressed as the California Bearing Ratio (CBR)

Therefore, for a given CBR and ESAL, we can calculate the minimum required Structural Number (i.e. thickness of our armor).

The subgrade’s CBR is determined by geotechnical testing during the project’s design phase. And ESALs are determined by traffic counts in the design phase. Therefore, the Structural Number is always “project-specific” based upon ESALs and the subgrade’s CBR.

After calculating the required Structural Number, the designer selects material and layer thicknesses — the armor. Both AASHTO and ODOT assign Structural Coefficients to various pavement materials. Using



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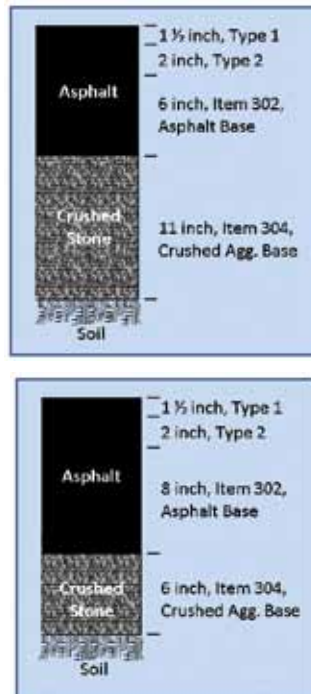
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the coefficients for the various pavement materials, and multiplying each by the thickness of the respective material, the structural contribution of each layer is determined. The sum of the structural contribution from each layer must add up to the minimum design Structural Number. Although this procedure may sound complicated, it's not. This article discusses the fundamental core concepts. But for an actual design example, with all the input details, please refer to ODOT's website, 400 Flexible Pavement Design. Calculating the Structural Number is simple and the coefficients are easy to use. In fact, coefficients are especially useful in comparing the strengths (per inch) of the various pavement materials.



A caution here; at some time you may encounter a pavement analysis where asphalt and concrete are being compared using the Structural Number (SN) concept. Your yellow caution flag should be waving, as such a comparison is not legitimate because the SN is only applicable to flexible pavement buildups. There is NO structural layer coefficient for concrete pavement.

ODOT'S STRUCTURAL COEFFICIENTS

- ODOT Item 424, 442, 446, 448, Surface Course Mixes = 0.43
- ODOT Item 442, 446, 448, Intermediate Course Mixes = 0.43
- ODOT Item 301, 302, Asphalt Base = 0.36
- ODOT Item 304, Aggregate Base = 0.14

ODOT lists more coefficients on its website under 400 Flexible Pavement Design. These coefficients are additive for each inch of thickness.

DESIGN EXAMPLE

Let's assume that based upon the factored ESALs and the sub grade's CBR, you calculate a minimum design Structural Number of 5.20. Using ODOT's coefficients, you select:

1 1/2" ODOT Item 448, Type I Surface Mix @ 0.43 =	0.65
2" ODOT Item 448, Type 2 Intermediate @ 0.43 =	0.86
6" ODOT Item 302, Asphalt Base Mix @ 0.36 =	2.16
11" ODOT Item 304, Aggregate Base @ 0.14 =	<u>1.54</u>
Structural Number	5.21

This time, let's juggle layer thicknesses and reduce the aggregate base thickness in favor of more asphalt base to reduce bottom strain:

1 1/2" ODOT Item 448, Type I Surface Mix @ 0.43 =	0.65
2" ODOT Item 448, Type 2 Intermediate @ 0.43 =	0.86
8" ODOT Item 302 Asphalt Base Mix @ 0.36 =	2.88
6" ODOT Item 304 Aggregate Base @ 0.14 =	<u>0.84</u>
Structural Number	5.23

As you can see, the second section uses a standard 6-inch aggregate base thickness to achieve the minimum 5.20 Structural Number by using a thicker, more springtime-stable asphalt base. Therefore, the second section will resist fatigue cracking better than the first section.

Also, aggregate-base thicknesses more than 10 inches provide diminishing returns. ODOT's typical aggregate-base thickness of 6 inches offers public agencies a bigger asphalt-armoring budget when juggling coefficients. And you may actually win the war with reserve strength. How? Because the asphalt-base course coefficient may be even higher than ODOT credits it.

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Although ODOT uses an asphalt base coefficient of 0.36, and AASHTO uses an asphalt base coefficient of 0.44 — recent testing by the National Center for Asphalt Technology (NCAT) justifies an even higher value — 0.54. While NCAT's higher coefficient is not universally accepted yet, you can always use ODOT's 0.36 coefficient with conservative, Kevlar confidence.

LIFE CYCLE COST ANALYSIS (LCCA)

Public agencies sometimes turn to LCCA to justify costly armor. They want numbers — believing that figures don't lie. Yet, there is considerable skepticism about LCCA.

For example, asphalt and fuel price volatility casts doubts on accurate long-range forecasting. The only way to do a valid LCCA is to compare actual Life-Cycle Costs through time. Former ODOT Pavement Engineer Willis Gibboney actually did this in 1995, comparing Ohio's flexible and rigid pavement costs dating from 1958. The Winter/Spring 2011 *Ohio Asphalt* covers this topic in detail. Plus, Gibboney's 1995 study is published on Flexible Pavement of Ohio's (FPO's) website.

But what's important is that all of the original asphalt base pavements on Ohio's Interstate System are still in active service — never needing major rehabilitation. Rigid pavements, on the other hand, have failed. Rigid pavements have required either complete replacement or major rehabilitation. So time and history provide the best LCCA. It's hard to ignore more than a half-century of faithful service.

A GOOD PRESCRIPTIVE PAVEMENT STANDARD FOR LOWER-VOLUME PAVEMENTS

Several years ago, the City of Columbus updated its street standards following an extensive engineering evaluation. Following Columbus' study, during the summer of 2007, FPO published an article called "Pavement Standards for Local Roads and Streets;" this article includes a handy consensus-based table. Asphalt thickness ranges from 6 inches to 13 inches (all on 6 inches of aggregate base). This table is an excellent comparison tool. You can find it on FPO's website under Technical Documents, Item 3. If you're using prescriptive roadway sections, please review this chart, and make a side-by-side comparison. This is a fast way to check your armor.

CONCLUSION

Our 'Win the War' series has featured a reliable battle strategy aimed squarely at preventing fatigue cracking. The key is to stabilize the subgrade and ensure that all aggregate base material is well drained — no bathtubs. Then add durable asphalt-base armor followed by an intermediate and surface course — three asphalt layers. You're ready for war. While ODOT is using this strategy in both designing and building pavements, many local agencies are ignoring this option. Time-tested asphalt-base pavements are the best value. Although the initial cost is slightly higher, the life-cycle cost is much lower. Public inconvenience is less. Valuable resources are conserved. And your success lasts for generations.

You win the war.



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