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THE JOURNAL OF OHIO'S ASPHALT PROFESSION

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THE JOURNAL OF OHIO'S ASPHALT PROFESSIONALS

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## THE PRESIDENT'S PAGE



**CLIFFORD URSICH, P.E.**  
PRESIDENT & EXECUTIVE DIRECTOR

**"A lot is slated to take place in 2017 – much with an eye to strengthening existing markets and developing future ones. This time next year we'll be evaluating our accomplishments and planning for 'What's New in 2018!'"**

# WHAT'S NEW FOR 2017?

Welcome to 2017 and the prospects of new and better things for asphalt pavement.

The asphalt business is like a rolling stone – moss doesn't grow on it. That's a good thing because it's indicative of an industry attitude bent toward improving things with an eye to the future. It makes life exciting in the asphalt business to see new materials and methods explored to accomplish tasks more efficiently and effectively. That will be true in 2017, as the industry works in conjunction with agency and academia to improve durability of longitudinal joints, address segregation, deploy hot-mix pavement preservation strategies, evaluate bonding membrane, build better low-volume roads and test rejuvenators as a component of asphalt mix.

### **IMPROVING DURABILITY OF LONGITUDINAL JOINTS**

The year 2015 saw the introduction of an experimental specification to improve the life of longitudinal joints – the seam made by the matching of two passes of an asphalt paver. Longitudinal joint life has been the subject of much discussion and cause for much hair pulling by agency and contractors alike. There's no doubt that solving that problem will add two to four years of life to asphalt pavements. Consider the costs associated with that – or should I say consider the potential economy achieved when that Holy Grail is found. I don't expect for us to find asphalt's holy grail, but I do have great expectations that we will make much progress. Here's why ...

In 2015, contractors utilized new strategies to meet requirements of a pilot ODOT specification specifically designed to address head-on contractor skills in constructing longitudinal joints. Also, the FPO Operations Committee championed an effort to provide educational materials explaining Longitudinal Joint Construction Best Practices. The pilot projects demonstrated that contractors could improve density of the asphalt in this critical area – density being the necessary asphalt layer property for ensuring long life. Contractors used various techniques to accomplish the result. Some trimmed back pavement edges. Others, used asphalt joint adhesive material. In all cases, much greater attention was given to the rolling of the joint. Additional projects of this type are slated for the 2017 construction season.

The focus on longitudinal joint construction methods carried through 2016, with the introduction of a new approach to attaining longer-lasting joints. The Illinois Department of Transportation had one of those "aha" moments when it revisited a pilot project long since forgotten. The project used an 18-inch-wide band of heavily polymer-modified asphalt placed prior to the construction of the joint for the purpose of attenuating joint distress. The pilot was discovered after a decade of service. Indeed, the treatment had attenuated longitudinal joint distress in a remarkable way. The treatment, void reducing asphalt membrane (VRAM), was brought to Ohio by FPO member Asphalt Materials and piloted



Figure 1: US-51 Decatur IL, 12 years service, VRAM treated area in foreground

in ODOT districts 5, 10 and 12. With agencies anxious to improve longitudinal joints, you can expect to see more of this in 2017.

### ADDRESSING SEGREGATION

Progress is being made in improving the overall durability of asphalt pavement surfaces. Completely uniform pavement textures that inhibit moisture intrusion and oxidation should be the goal for every asphalt paving job. Achieving that goal, however, had been made difficult, as coarse-textured mixtures came into prominence. These mixes were developed for the purpose of ensuring deformation resistance (i.e. rutting and shoving). Well, in keeping with Newton's Third Law, "for every action, there is an equal and opposite reaction," these mixtures provided more rut resistance but in doing so lost their forgiveness. Uniform surface texture gave way to segregation. Private markets and local governments wondered where their beautifully smooth asphalt had gone? Recognizing this fact, FPO developed 404LVT for local government use and private markets. Now, ODOT is coming aboard with modifications to its 12.5 mm and 19.0 mm Item 442, Superpave asphalt mixes. Beginning with the 19.0 mm mix, gradation has been modified to provide a finer-textured mix and additional asphalt binder (glue) to hold it all together. This initiative is the product of a partnering effort between ODOT and the FPO Technical Committee. That partnering effort was extended to include the FPO Operations Committee.

The joint ODOT/FPO Operations Committee is in this effort to eliminate segregation as well. Being developed is a demonstration specification for paver-mounted thermal imaging. Using infrared technology, this tool measures the temperature of a mat immediately behind the asphalt paver. Its function is to measure surface temperature and compute  $\Delta T$  (temperature differential). Being able to scan and measure temperature full-width of the mat has real advantages. Research indicates  $\Delta T$  can be used as an indicator of mat segregation. I say it's a tool because it provides

real-time information to the paving crew to which they can respond such that uniform temperature is maintained. As I write this, a draft specification is in process. The goal is to pilot two projects in 2017. We'll see.

### DEPLOYING HOT-MIX PAVEMENT PRESERVATION STRATEGIES

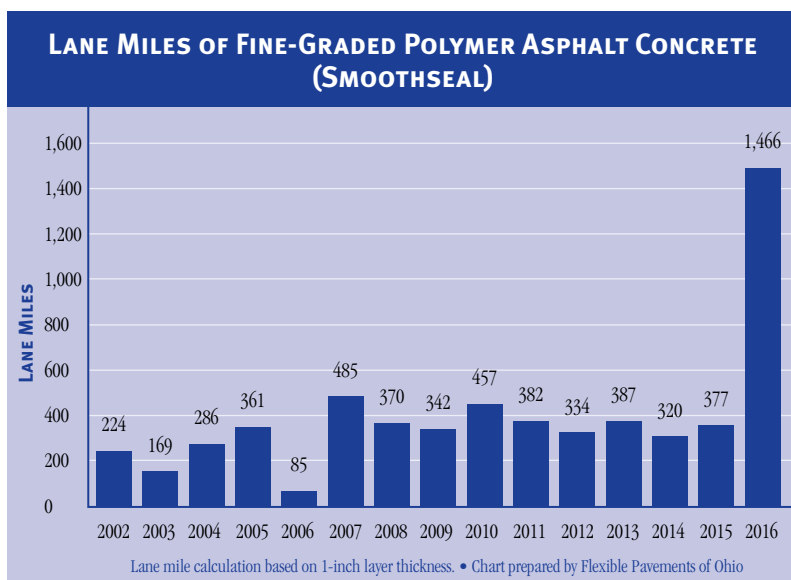


Figure 2: Thinlay Asphalt Concrete, OH-US Route 50

Pavement preservation rolls with ODOT leading the way. Conventional asphalt overlays have long served in this capacity, but in recent years the use of modified asphalt and the availability of a wider variety of binder grades have provided the industry greater opportunity to show superior performance using thinner layer treatments. Fine-Graded Polymer Asphalt (a.k.a. Smoothseal) has been a favored treatment for its durability, smoothness

and friction properties – and the numbers demonstrate that fact.

Introduced in March 2016, was Ohio's Thinlay – a mix developed to run the gamut of traffic types and provide greater overall economy. Modeled after the beloved "404" specification, thinlay mixes enjoy higher asphalt binder content and finer, smoother texture – just like 404. It's a handsome mix. Try it and see for yourself. Three projects – two under ODOT contract – were constructed in 2016, and the word is ODOT anticipates letting projects in 2017 to continue its pilot of the mix. This round will demo alternate bidding.





## EVALUATING BONDING MEMBRANE

For nearly a decade there has been intense focus on the application of tack coat. Tack, as many of you know, is an essential material for ensuring bonding of a new asphalt layer to an existing pavement. As a component of an asphalt pavement buildup, it ensures the layers act monolithically (as one slab). So critical is bonding that the absence of such can result in delamination; worse yet, a strength reduction that will reduce the designed life of an asphalt pavement. The challenges associated with tack coats revolve around uniform application and pick-up from trucks hauling asphalt to and from paving operations. Track-free materials have successfully mitigated the pick-up issue, but now a new bonding material shows promise. This material not only eliminates pick-up, but also enhances bond. The previously mentioned

VRAM material has demonstrated the ability to serve the function of a bonding membrane. Applied at a rate of 0.15 gallons per square yard the material provides complete coverage. Similar to an emulsion tack coat operation, a distributor is used. However, the distributor must be outfitted to accommodate higher pressure to spray this more viscous material. This is a premium material that provides the added value of improved bond and some improvement in impermeability.

## BUILDING BETTER LOW-VOLUME ROADS

Approximately 40 percent of the ODOT roadway system is comprised of roads classified as "Low Volume." Add in the county and township roadway systems and you begin to get a grasp of just how much pavement this classification represents. Recognizing this reality, Ohio University's

ORITE (The Ohio Research Institute for Transportation and the Environment) hosted a conference to do some technology transfer from ODOT and industry to Ohio's county engineers. An outgrowth was an initiative to test various pavement strategies that had potential for improving Ohio's low-volume road system. ODOT took a lead role and initiated the Southern Ohio Low Volume Experimental Road.



SOLVER is being constructed on Vinton


County, U.S. Route 50. Phase 1 was completed in 2016. Phase 2 is in design and will be bid this year. The experiments on Phase 1 include: Non-Aggregate Stress Absorbing Membrane Using VRAM, Superpave 9.5 mm and 19.0 mm Modified Aggregate Gradations, Open Graded Friction Course Modified with Winterpave, High Reclaimed Asphalt Pavement (RAP) Content Mixes Using Rejuvenator, THINLAY Using PG64-22 and Low Void (1%) Type 1 Using PG76-22M. Phase 2 will further investigate the use of rejuvenators in high RAP mixtures.

A lot is slated to take place in 2017 – much with an eye to strengthening existing markets and developing future ones. This time next year we'll be evaluating our accomplishments and planning for "What's New in 2018!"



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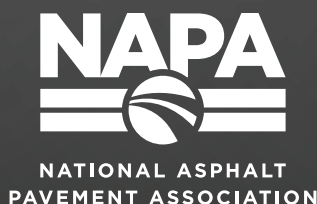
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THIS ISSUE CONTAINS THE FIRST OF A FOUR-PART SERIES ON THE HISTORY OF ROADWAY CONSTRUCTION IN OHIO, HOW ASPHALT PAVEMENT BECAME THE DOMINANT ROADWAY BUILDING MATERIAL AND WHAT CHALLENGES THE INDUSTRY MAY FACE IN THE DECADES TO COME. WE HOPE YOU ENJOY THIS LOOK AT WHERE OUR INDUSTRY CAME FROM AND HOW TOGETHER WE CAN USE OUR HARD-EARNED EXPERTISE TO MEET OHIO'S FUTURE HIGHWAY NEEDS.

Forms were used to construct early asphalt roads. (ODOT photo)



# FOOTPATHS TO FREEWAYS, PART I

By Emily Foster

## 20TH CENTURY BROUGHT OHIO MOTORISTS OUT OF THE MUD ONTO SOME OF THE NATION'S BEST ENGINEERED HIGHWAYS

Once a network of footpaths through the forest, Ohio's roads now make up part of a national paved network speeding people and goods into the 21st century. The development of asphalt paving dominates this story.

Even before Ohio became a state, the laws governing the Northwest Territory — the area that became Ohio, Indiana, Illinois, Michigan and Wisconsin — required that every able-bodied white male work on road building for up to 10 days a year or send money or a substitute worker.

Still, for years the only real road in the territory was Zane's Trace, from Wheeling through Zanesville and then southwest to the Ohio River. When Ohio joined the Union in 1803, the statehood act required that 3 percent of the proceeds of state lands sold by Congress were to be used to make public roads. In 1804, another law provided details on how landowners might petition for a road and who would be responsible for building and

maintaining it. The law specified that "all timber and brush should be cut and cleared off at least 20 feet wide, leaving the stumps not more than 1 foot in height," and that timbers should be laid across muddy places.

The National Road (later U.S. Route 40) reached Columbus in 1833, Springfield in 1838 and the Indiana line in 1840. It was congested from the start. Traffic through Zanesville in 1832 included 2,357 large wagons, 11,613 two-horse vehicles, 14,907 one-horse vehicles and 35,310 horseback riders, plus large droves of farm animals.

It was a high-crowned road of stone and gravel four rods (66 feet) wide, with a ditch on either side, and constructed according to the best engineering principles of the time. Early engineers understood that good drainage is vital. They came up with a paving system that involved a bottom layer of large aggregate covered by layers of smaller stones and gravel that packed together.





This interlocking system transferred the load of the vehicle on the surface of the road to the earth and drained water off before it reached the underlying soil. While sand was sometimes used on top as a binder, dust was not much of a problem because of the slow pace of vehicles.

So-called macadam roads were uncommon off the beaten path, however, as Cyrus T. Bradley, who traveled by stagecoach from Columbus to Sandusky in 1835, wrote, “We would occasionally, without warning, dive into a hole of unknown depth, filled with black mud . . . and there stick.”

Rural roads long remained primitive and, in some seasons, nearly impassable. Improvements often consisted of throwing large rocks or shale on the roadbed and letting traffic tamp them down. In some places plank or “corduroy” roads, with a lifespan of about seven years, kept wagon wheels out of the mud.

As the state grew so did the road system. By 1873, Ohio had 1,502 miles of toll roads, 4,327 miles of free turnpikes and some 66,000 miles of state, county and township roads.

The launch of Free Rural Delivery in 1893, called attention to the isolation of rural areas. In 1894, Congress added \$10,000 to the budget of the U.S. Department of Agriculture to explore road improvement and management. Also, bicycling helped force improvements. Before Americans owned cars, they rode bicycles, buying a million of them a year by 1899. But their weekend outings to rural areas were spoiled by terrible roads. They started a public relations campaign that cleverly captured the support of the railroads by arguing that farmers needed good roads to get their livestock and produce to the nearest train station.

After Henry Ford started mass-producing the Model A in 1907, the cost of a car dropped dramatically and the number of registered vehicles rose to more than 2 million. Between 1921 and 1940, miles of paved roads nationally more than tripled, and America’s love affair with the open road was in full swing.

Ohio’s Highway Department was created in 1905. At first it played only an advisory role, issuing specifications for various aspects of road building, such as drainpipes and grading. The state authorized \$10,000 for road improvements to be divided equally among the 88 counties with a 25-percent match to local funds. In the first year, only one county, Highland, applied for money. It was a modest beginning.

It was immediately evident that the state’s 25-percent match was not enough. Ohio soon increased its share to 50 percent, but the money was restricted to repairs on existing roads and the Highway Department had no quality control over the work.

Instead, the Highway Department set up a testing lab on the Ohio State University campus in 1909, to develop and test new surface methods and materials. The department also designated sections of roadway for experimental construction with a variety of paving materials such as asphalt block, and pavement mixtures known as petrifalt and Hassam. None was proof against rutting caused by the growing number of motor vehicles. Rutting became such a headache that transportation authorities erected signs warning drivers not to follow the tracks of the vehicle in front of them.

As highway improvement funds amounted to more than a half-million dollars, they went toward upgrading dirt roads to macadam. The Highway Department’s stated aim was the improvement of rural highways in order to get children to school, increase the value of farmland, move troops in time of war and entice families to the suburbs, where they could raise vegetables, keep a cow and chickens and enjoy the healthy country air within commuting distance of urban jobs. In those days, this was not yet known as urban sprawl.

World War I drew national attention to the inadequacy of roads under the stress of motorized vehicles, especially military equipment. But after the war, some Ohio counties still had fewer than 30 miles of paved roads.

*continued on page 13*

## ASPHALT GETS ORGANIZED

In the fall of 1932, in the depths of the Great Depression, C.W. (Cliff) Simpson, president of Federal Asphalt Paving Company in Hamilton, brought together a group of asphalt paving contractors at the Deshler-Wallick Hotel in Columbus to form the Ohio Asphalt Paving Constructors Association (OAPCA). It was the first organization dedicated specifically to promoting asphalt paving in Ohio.

It was succeeded in 1943 by the Bituminous Concrete Producers Association (BCPA). The group's major goal from its inception was to increase the tonnage of asphalt contracts let by the Ohio Department of Highways to 1 million tons a year.

At the time, asphalt was considered a maintenance material, as concrete was in the driver's seat of Ohio's highway construction industry and remained so right up to the 1960s. So little work was being done in Ohio and elsewhere in the years just after World War II that Your Thoroughfare printed a lead article entitled "Ouch!" in its August 1947 issue. Of the highway paving contracts let in the 1950s, "We just got the crumbs," long-time BCPA office manager Jean Snyder recalled.

Ted Kirkby of S.E. Johnson Company Inc. in Maumee was one of the prime movers in the formation of Flexible Pavements

Inc. in 1962, just as the paving industry was about to change. Partly because of automation, asphalt pavements cost less in 1966 than they had 10 years before.

Despite the challenge of the oil crisis, the industry's rewards were abundant in the 1970s. Aging concrete interstates began to require major repairs. Large portions were resurfaced or replaced — with asphalt. For 15 years during the 1970s and '80s, Flexible Pavements Inc. Executive Director Bill Baker, was a dominant figure on the state and national scenes. He emphasized technical expertise aimed at product improvement, and he heavily promoted the "fractured slab" technique, now known as rubblization, for breaking up existing concrete highway slabs to be used as the base for new asphalt pavement. He led Flexible Pavements Inc. and the paving industry out of the cold and into a high-tech world where asphalt came into its own. Once a poor cousin to rigid pavement, asphalt became the reigning choice for highway construction.



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In 1923, bituminous surface treatment of several thousand miles of rural roads was begun, the first step in rendering them suitable for all-weather travel. Legislation also required counties to establish highway systems that linked with other inter-county systems.

Ohio instituted its first gas tax – two cents – in 1925, and half of all Ohio auto license fees and motor bus taxes also went to road maintenance and repairs. Finally, the state highway system was adopted in 1927, ending the old state-county system.

The Great Depression was in some ways a boon to road building. Public works programs, including those of the Works Progress Administration (WPA), financed the construction of 651,000 miles of roads around the country, and was responsible for much of the roadwork done in Ohio through those difficult years.

During World War II, roads of strategic importance to the war effort again received priority attention. But when the war ended, the Ohio Highway Department looked ahead to an ambitious \$200-million reconstruction plan, including limited access expressways through urban centers, modernization of inter-city routes and rural road improvements. The Ohio

General Assembly raised the gas tax to five cents a gallon and passed a \$500-million bond issue for highways.

This reflected an aggressive national effort to interconnect the country. The Ohio Turnpike, opened in 1955, and was Ohio's first major modern highway. The Federal-Aid Highway Bill of 1956 launched the largest public works project in the history of the country by making federal interstate highway funding available with a state share of only 10 percent. Although the federal government had levied a gasoline tax since 1932, it was only with the 1956 highway bill that the proceeds were specifically directed into a highway trust fund. Construction in Ohio began in 1957, and by 1966, 959 miles of interstate were open to traffic.

At the end of the 1960s, Ohio began work on 225 miles of four-lane highway in the southern part of the state. And in 1970, ground was broken for Ohio's Highway Transportation Research Center.

The 1970's oil embargo and energy crisis, along with the growing environmental movement, shifted national focus to a broader-based transportation system. In response, Ohio's Department of Highways was renamed the Ohio Department of Transportation (ODOT). Although it now

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explored such issues as bus lanes and increased rail access, highways remained the department's main focus.

With the energy crisis, fuel consumption dropped in the Midwest and income from gas taxes fell accordingly. Through the rest of the decade, funding lagged behind maintenance needs for Ohio's 19,000 miles of roadway.

In 1981, the General Assembly raised the gas tax by four cents and, in a unique provision, allowed for adjustment in the tax to compensate for a rise in road construction costs or a drop in fuel consumption. With new funding available at both the state and federal levels, ODOT let record amounts of new construction and maintenance projects. The Ohio Legislature raised

the gas tax twice in the 1980s to try to keep up with the need for resurfacing — estimated at 1,900 miles a year. In 1990, ODOT let nearly \$1.1 billion in highway projects, the most-ever in Ohio history.

With the new century, the final section of Ohio's part of the Interstate Highway System, the Spring-Sandusky Interchange in Columbus, was under construction. By the time it was built, major reconstruction work was already underway on most of the earlier sections, this time using asphalt pavement rather than portland cement concrete — the original construction material.

The 20th century brought tremendous progress, often under difficult circumstances, in the extent and quality of roads in Ohio. Motorists got out of the mud and onto some of the best engineered highways in the nation.

*Emily Foster retired as an associate vice president at The Ohio State University. She earlier worked as a public relations specialist and served as editor of Cincinnati Magazine and as senior editor of Columbus Monthly. She has published three books about Ohio history.*

*The second part of the Footpaths to Freeways series will look at the development of Ohio's asphalt paving industry and improvements in paving products and practices over time.*



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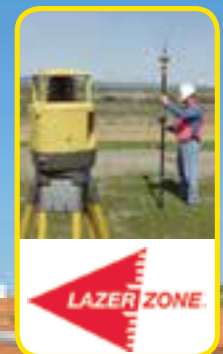
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### EXCEL SESSION 2 – A FULL-DAY EDUCATION TRACK ASPHALT PLANT OPERATORS



Asphalt Plant Operators provides insights for efficiently managing an asphalt plant and troubleshooting a variety of potential issues, and is taught by T. J. Young, president of Technical Training and Advisory Services Company (T2ASCO), who is

actively involved in developing technical materials and qualification and training programs for the industry.



# 2017 OHIO ASPHALT EXPO SCHEDULE AT A GLANCE

## 2017 EDUCATIONAL SESSIONS AND CALENDAR OF EVENTS\*

The Equipment Exhibition and Trade Show runs during both days of the Ohio Asphalt Expo concurrently with our educational sessions and other events. As always, the exhibition is free and open to all attendees.

Date	Time	Gemini Ballroom A	Gemini Ballroom B	Gemini Ballroom C	Polaris Ballroom C	Polaris Ballroom F
TUESDAY, MARCH 14			Member Only Event	Open to All Attendees	Education Session 1	Education Session 2
	7:30 AM		FPO Member Breakfast and Business Meeting	Public Agency Forum Jeff Stauch, Union County Engineer Moderator	7 Best Practices Critical for Mix Success TJ Young, T2ASCO, LLC	A View from the Road John Ball, Top Quality Paving and Training
	8:30 AM					
		Education Session 3	Education Session 4	Education Session 5	Education Session 6	Education Session 7
	9:30 AM	National Health & Safety Issues Update Howard Marks, National Asphalt Pavement Association	Ohio Department of Transportation Low Volume Test Road Roundtable	Segregation: Where It Starts, Identifying The Cause and How to Eliminate It Laikram Narsingh, Wirtgen America	Troubleshooting Mix Problems TJ Young, T2ASCO, LLC	Nighttime Paving John Ball, Top Quality Paving and Training
	10:15 AM					
	NOON	Quality Asphalt Pavement Paving Awards Luncheon (Polaris Ballrooms A, B, C, D, E & F)				
		Education Session 8	Education Session 9		Education Session 10	Education Session 11
	2:30 PM	Understanding and Managing Construction Bond and Insurance Risks Andy Natale & Marc Sanchez, Frantz Ward LLP	Capitol Hill Report Jay Hansen, National Asphalt Pavement Association		A Simplified Approach to Plant Maintenance TJ Young, T2ASCO, LLC	Putting Together the Puzzle John Ball, Top Quality Paving and Training
	3:15 PM		Ohio Department of Transportation Program & Funding Update Jennifer Townley, Ohio Department of Transportation			
	5:00 PM		Quality Paving Celebration (Polaris Ballrooms B, C, E & F)			

WEDNESDAY, MARCH 15	7:30 AM	<b>Prayer Breakfast (Polaris Ballrooms A, B, D &amp; E)</b>				
		<b>Education Session 12</b>		<b>Education Session 13</b>	<b>Education Session 14</b>	
	9:30 AM	<b>Asphalt Mixture &amp; Binder Type Selection</b> Bill Fair, Flexible Pavements of Ohio		<b>Improving Longitudinal Joint Performance Using VRAM</b> Marvin Exline, Heritage Research Group	<b>Thinlays for Pavement Preservation</b> Cliff Ursich, Flexible Pavements of Ohio	
	10:15 AM			<b>Achieving Smoothness with Milling</b> Aidan McDonnell, BOCA Construction Jeff McGowan, Shelly & Sands, Inc.	<b>Thinlays...What the Research Says</b> Mary Robbins, Ohio University	

\*Program and featured speakers are subject to change.

## 2016 QUALITY ASPHALT PAVING AWARDS LUNCH

Each year at the Expo, the top asphalt construction projects are recognized through the industry's prestigious Quality Asphalt Paving Awards for outstanding work performed during the previous calendar year.

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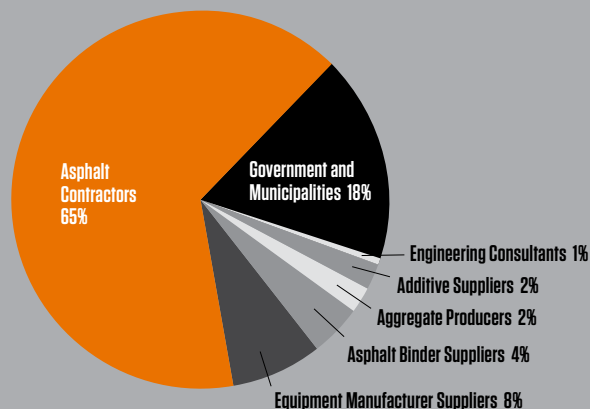
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## LOOK AT WHO ATTENDS THE OHIO ASPHALT EXPO

The OHIO ASPHALT EXPO serves a wide variety of audiences across the asphalt paving industry. If you are a contractor, producer, specifier, plant operator, or public official, this event is for you.



# TECHNICAL BULLETIN: Specifying Asphalt Pavements in Ohio

Flexible Pavements of Ohio's (FPO) Technical Bulletin, "Specifying Asphalt Pavements in Ohio," has been updated as of February 6, 2017, and is reprinted in its entirety in this issue of *Ohio Asphalt*. Prior to the most-recent update, the bulletin was last updated in 2014 to encompass significant changes to ODOT asphalt concrete specifications that became effective at that time.

"Specifying Asphalt Pavements in Ohio," gives user guidance on asphalt concrete materials commonly available for use in Ohio, and how to apply and specify those materials and administer the contract acceptance of those materials.

Several recent developments have created the need to update this guidance document:

- Interest in and development of specifications for Thinlay Asphalt Concrete treatments for pavement preservation treatments
- Development of specifications for asphalt concrete for low-volume road and street applications to improve performance of surfaces on low-traffic applications
- Updates to the ODOT Pavement Design Manual, 2016 Construction and Material Specifications and Asphalt Institute reference manuals, MS-2 and MS-26

"Specifying Asphalt Pavements in Ohio" and other guidance documents can also be found on the FPO website at: <http://www.flexiblepavements.org/technical-resources/technical-bulletins/technical-bulletins>.

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## Technical Bulletin: Specifying Asphalt Pavements in Ohio (6February2017)

### General

High-quality pavements are the result of well-engineered pavement designs, high-quality materials, proper placement procedures, accurate and complete contract specifications and an adequate quality-assurance program. The purpose of this Technical Bulletin is to introduce the various asphalt materials available for use in Ohio, to raise awareness of the information necessary to draft complete contract specifications, and to assist agencies in adopting specifications utilizing quality control and acceptance. It is not the intention of this document to supplant proven successful means of specifying asphalt pavements.

However, for those agencies who desire to remain current with industry practice this document may prove helpful.

### Paving Materials

This section contains a description of the asphalt concrete materials suggested for use. It is based on the Ohio DOT Construction and Material Specifications (ODOT C&MS).

ODOT C&MS provides a well-known high standard for paving materials and construction. It is used extensively in local government and private work.



ODOT is constantly improving its specifications. Recent changes to ODOT asphalt concrete specifications have changed the way in which standard asphalt concrete mixes are specified. This update incorporates those changes.

### Asphalt Binder

Beginning in 1997, Ohio's asphalt industry shifted from viscosity-graded asphalt cement (AC grades) to performance-graded asphalt binder (PG grades). This new specification system for paving asphalt is one result of research conducted under The Strategic Highway Research Program (SHRP). The term "binder," rather than cement, is used because the specification is intended for modified as well as unmodified asphalt cement.

Physical tests were developed to measure engineering properties of paving asphalt over a range of temperatures and rates of loading. The specification based on these tests delivers more predictable performance under actual field conditions.

The asphalt binder grade adopted by ODOT for medium (normal) traffic is PG 64-22. PG stands for performance grade. The numbers represent the temperatures (in degrees Celsius) for which the binder was graded to perform. The 64 stands for the average seven-day-maximum pavement temperature, and the minus-22 stands for the one-day-minimum pavement temperature at which the pavement will perform satisfactorily.

See the "Grade of Binder" section (pg. 23) for additional discussion of binder grade options. A complete discussion of PG binders can be found in Asphalt Institute publication MS-26, Asphalt Binder Handbook.

### Mixtures

The asphalt mixtures suggested for use are Standard ODOT C&MS Items with the exception of Thinlay Asphalt Concrete, 404LVT and SS 823, Light-Traffic Asphalt Mixture described under Specialty Mixes (pg. 24). These mixtures are available from asphalt-mix producers throughout the state. Many asphalt-mix producers have developed their own mixtures for commercial or non-specification uses.

The ODOT C&MS includes mixtures that are formulated in one of two ways – recipe mixes formulated by ODOT and formulations by the contractor using a mix-design methodology. The items in those two groups are as follows:

#### Mixtures Formulated By ODOT

- 301 Asphalt Concrete Base

For this Item, ODOT specifies the proportion of coarse and fine aggregate in terms of the percentage passing the No. 4 laboratory testing sieve and the percentage of asphalt binder. Both of these factors may vary somewhat from one asphalt-mix producer to another depending upon the characteristics of the aggregates being used.

The ODOT formulations were based on laboratory tests on aggregates from the many sources throughout Ohio and on experience in the field. They have been called "historical mixtures" and are on record for repeated usage.

ODOT C&MS Section 403 has provided for production quality control and acceptance of the 301 mixture. The contractor observes production operations, conducts tests and prepares daily reports of all activities affecting the quality and quantity of mixtures produced and shipped to the project site. Acceptance of the mixture for composition is based on monitoring the contractor's quality-control testing and on the analysis of samples by ODOT.

#### Mixtures Formulated By The Contractor

- 302 Asphalt Concrete Base
- 441 Asphalt Concrete, Type 1 and 2 (Surface and Intermediate courses)
- 442 Superpave Asphalt Concrete, 12.5 mm, 9.5 mm or 19 mm, Type A or B (Surface and Intermediate courses)

For Item 302, the contractor is required to develop a job mix formula (JMF) within limits for composition and for characteristics determined by laboratory volumetric tests. Production quality control and acceptance of the mixture are as provided in ODOT Section 403.



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For Items 441 and 442, the contractor is required to develop JMFs within limits for composition and for characteristics determined by laboratory volumetric tests. The contractor also is required to do quality control testing.

### Item Descriptions and Uses

Item 301 Asphalt Concrete Base is an asphalt-base course mix for use in pavement designs where a base-layer thickness of 3 inches (75 mm) or more is needed. Item 301 may be placed directly upon prepared subgrade, aggregate base, or existing pavement surface. This may be specified as:

ODOT Item 301 Asphalt Concrete Base, PG 64-22

Item 302 Asphalt Concrete Base is an asphalt-base mix having the same uses as Item 301, but incorporates larger-size aggregate. Its minimum layer thickness is 4 inches (100 mm). If the plan thickness is 7.0- 7.75 inches and mixture production has 95% passing the 1.50-inch sieve, the 302 may be placed in two lifts. The gradation limits are not as constrained and they ensure the coarse aggregate is dominant in providing a strong aggregate structure. That structure is considered necessary to resist shear stresses induced by heavy traffic. This may be specified as:

ODOT Item 302 Asphalt Concrete Base, PG 64-22

### Item 441 Asphalt Concrete, Types 1 and 2

Specifications for these materials changed substantially on July 18, 2014. All mixtures for these Items are designed by the contractor. Composition and mixture requirements are in ODOT C&MS Section 441. These mixes are designed for traffic applications of less-than 1,500 average daily truck traffic (ADTT). Section 441 also contains requirements for the contractor's production quality control operations.

Type 1 uses a dense gradation with a ½-inch, minus-top size and is comparable to Items 403 and 404 (1997 ODOT C&MS). Type 2 uses a dense gradation with a ¾-inch, minus-top size and is comparable to Item 402 (1997 ODOT C&MS) as to aggregate top size and uses. See Table 2 (pg. 22) for the specification descriptions for 441 mixes.

Item 442 Superpave Asphalt Concrete mixtures are designed by the contractor based upon Asphalt Institute "Manual (MS-2), Asphalt Mix Design Methods. Composition and mixture requirements are contained in ODOT C&MS Section 442. Mixtures are denoted by the nominal maximum-aggregate size (NMAS). [note: NMAS is defined as one sieve larger than the first sieve to retain more than 10 percent in a gradation.] In Ohio, the 9.5 mm mix is used for variable thickness, scratch and leveling

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courses, and surface courses for medium-traffic pavements. The 12.5 mm mix is being used by ODOT on heavily traveled pavements and is the predominant Superpave surface course mix. Uniform thickness Intermediate courses use the 19 mm mix. See Table 2 for the 442 mixture specification descriptions.

## Acceptance

“Acceptance” is the term used to describe the contractual procedure by which an agency determines the acceptability of an asphalt material that has been mixed, placed and compacted as the final product in the construction of an asphalt pavement. Asphalt mixtures composed under the requirements of 441 and 442 mixes are accepted either by the requirements of Item 446 (i.e. density acceptance) or 448 (i.e. mixture composition acceptance). Further discussion of these acceptance methods is provided in section “Item Specification Under Which Material Will Be Placed.”

## Contract Specifications

Contract specifications need to clearly convey the intent of the agency/owner. To accomplish this, there are several pieces of information that must be communicated when specifying asphalt mixtures. That information includes:

- Project dimensions & course thickness
- Item specification under which material will be placed
- Description of material
- Item quantity
- Language for specifying asphalt composition
- Method & point of acceptance, and
- Sometimes the grade of binder and/or Traffic designation

## Project Dimensions & Course Thickness

Project dimensions include the width, length, thickness and any other dimensions needed to identify the location of the work and the area to be covered. The asphalt mixture paving process has the unique ability to smooth-out rough, irregular pavement surfaces. To accomplish this, the asphalt quantity must be sufficient to fill in low spots while maintaining the desired course thickness over bumps. Project dimensions are needed to ensure the proper quantity of asphalt is being placed per unit of area. While a nominal or average thickness is customarily shown on the plan, the quantity is calculated to a volume or weight to be placed per unit area. This is referred to as the “yield,” and is the measuring stick to ensure the plan dimension is met when placing asphalt mix over an irregular surface.

A rule of thumb to remember when specifying layer thickness is the layer should be 2-to-4-times the aggregate top size in the mix. For instance, the layer thickness for a surface course mixture with aggregate having a top size of 3/8 inch should normally not be less than 1 1/4 inch. The purpose of this rule is to ensure that sufficient layer thickness exists to promote consolidation of the mixture when the rolling equipment applies compactive effort. Usually, thicker courses are used than that determined by the “rule of thumb.” This is done to provide sufficient asphalt to correct irregularities in the surface being overlaid, promote

**Table 1 – Layer Thickness Guidelines**

Asphalt Mixtures	Thickness (inches)
<b>Surface Courses</b>	
Type 1	1 ¼ - 1 ½
Superpave 9.5 mm	1 ¼ - 1 ½
Superpave 12.5 mm	1 ½ - 2 ½
<b>Intermediate/Leveling Courses</b>	
Type 1	1 - 1 ½
Type 2	1 ¼ - 4 ½
Superpave 9.5 mm	1 - 1 ½
Superpave 19 mm	1 ¼ - 4 ½
<b>Base Courses</b>	
301	3-10
302	4 min.

mixture density and improve smoothness. Layer thickness guidelines are provided in Table 1.

## Item Specification Under Which Material Will Be Placed

Asphalt work items bid using ODOT specification designations require the designer to identify in the contract line item the specification under which the asphalt mixture is to be composed, and the item number for which it will be accepted. An example is the following:



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Item 441, Asphalt Concrete Surface Course, Type 1, (448), PG 64-22

Item numbers (e.g. 441) provide reference to the details needed by the contractor to manufacture and place asphalt, and explain the manner in which the material will be accepted (e.g. 448) by the agency. The agency must select the appropriate item of work for the project conditions. Item specifications typically used in Ohio local government projects and commercial paving work are those established in the ODOT C&MS. The ODOT specifications commonly used for surface and intermediate courses are Items 441 and 442 with 446 or 448 acceptance – for base courses, items 301 and 302.

**446 Acceptance** - The acceptance of asphalt mix placed under the provisions of Item 446 is based upon monitoring contractor quality-control tests. Acceptance of the compacted mixture is based on the level of density attained as sampled by the contractor and tested by ODOT. The intent of the density specification is to encourage thorough compaction of asphalt mixtures. This enhances pavement longevity and resistance to rutting that can occur under heavy traffic. Item 446 is only to be used when constructing layers having uniform lift thickness and the pavement foundation is sufficiently firm to support the compactive effort of the rolling equipment.

**448 Acceptance** - Acceptance of Item 448 mixtures for composition is based on monitoring the contractor quality-control testing performed at the mixing plant and on the analysis of samples by ODOT for mixture proportions. In this case, the asphalt mixture is separated into its components (i.e. aggregate gradation and asphalt binder content) and a comparison is made to the mixture's approved JMF. If the proportions of the hot-mix asphalt produced compare within acceptable tolerance of the JMF, then the material is deemed acceptable. If a uniform thickness course > 1-inch thick and 1-mile long is being placed, 448 may require density quality control and acceptance per Supplement 1055.

In recent years, ODOT has adopted the Superpave technology. Specification 442 outlines ODOT's Superpave mix-design requirements. The Ohio specification outlines requirements for a Type A and Type B mixture. The major difference between the two is the coarse-aggregate angularity requirement. The Type A mix has the higher angularity requirement. Type A (95% fracture), Type B (65% fracture).

### Description of Material

A description of the asphalt mix material desired for use is also a necessary part of every asphalt paving project. Material description provides information as to the material type, its gradation and whether the material is for use as a base, intermediate, or surface course. A catalog of descriptions is provided in Table 2.

Table 2 – Mix Type Descriptions

301	Asphalt Concrete Base, PG 64-22
302	Asphalt Concrete Base, PG 64-22
441	Asphalt Concrete Surface Course, Type 1, (446 or 448), PG 64-22 or PG 70-22M
441	Asphalt Concrete Intermediate Course, Type 1 (448)
441	Asphalt Concrete Intermediate Course, Type 2 (446 or 448)
442	Asphalt Concrete Surface Course, 9.5 mm, Type A or B (446 or 448)
442	Asphalt Concrete Surface Course, 12.5 mm, Type A or B (446 or 448)
442	Asphalt Concrete Intermediate Course, 19 mm, Type A or B (446 or 448)
442	Asphalt Concrete Intermediate Course, Type A or B, (448)

### Traffic Designation

Asphalt mixtures for surface and intermediate courses are formulated for the kind of traffic loads (trucks) that will use the pavement. Depending on the type of mixture being specified, plans may include the type of traffic or the quantity of truck traffic. Superpave mixtures (Item 442) are formulated for heavy-truck traffic Average Daily Truck Traffic (ADTT) > 1,500, ODOT uses 441 mixes for normal traffic of < 1,500 ADTT. This truck traffic may be too high for good performance on urban streets. Some suggestions for specifying mixes for various traffic designations are as follows:

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**Light-traffic** applications for such purposes as residential driveways, play areas, walkways, and paths for bicycles and golf carts, certain light-traffic local roads, light-traffic residential streets and infrequently used parking lots for cars. Use 441 mixes or special light-traffic mixes such as Thinlay Asphalt Concrete Type Light or Ultralight, 404LVT or mix formulated under ODOT Supplemental Specification 823, Light Traffic Asphalt Mixture

**Medium-traffic** applications include all roads, streets and parking lots used by less than about 300 heavy trucks per day per traffic lane. Use 441 mixes or 442, 9.5 mm mixes.

**Heavy-traffic** applications generally include roads and streets used by more than about 300 heavy trucks per day per traffic lane. Mixtures formulated for heavy truck traffic are relatively stiff. For that reason, they should be specified only for pavements designed structurally for heavy-truck traffic. Use 442 12.5 mm and 19 mm mixes.

## Grade of Binder

The asphalt-binder grade specified depends upon the climate, the location of the material in the pavement cross-section and the type of traffic to which the pavement will be exposed. Table 3 provides binder grades specified by ODOT for various standard material types.

Table 3 – Recommended Binder Grades <sup>1</sup>	
Binder Grade	To Be Used With:
PG 64-22	301 – Asphalt Concrete Base 302 – Asphalt Concrete Base 441 – All surface and intermediate courses having light or medium traffic
PG 64-28	442 – Asphalt Concrete Intermediate Course
PG 70-22M	442 – Asphalt Concrete Surface Course 441 – Asphalt Concrete Surface Course, Type 1, (for heavy traffic)
PG 76-22M	442 – High Stress Paving Mixtures <sup>2</sup>
PG 88-22M	442 – Extreme High Stress Paving Mixtures*, Bridge deck waterproofing

1. Agencies will sometimes find it useful to change the binder grade from the default grade shown in the ODOT specifications for heavy traffic or greater longevity. In such cases the bid item must include the desired grade, or a plan note indicating the change be provided.
2. High-stress paving mixtures are specially formulated to mitigate surface deformation taking the form of rutting, depressions, or shoving. For additional information on the treatment of high-stress locations, reference the ODOT Pavement Design Manual, Appendix B.

Asphalt binders are specified in Item 702.01 of the C&MS. Unmodified, Performance Graded (PG) binders are specified by reference to AASHTO M320-10. Modified binders are specified in table 702.01-1. In looking at M320-10, one might infer that a wide variety of binder grades are available for specification. In practice only a few essential grades are generally available and used in Ohio.

PG 64-22 is the basic grade of un-modified binder used for climate conditions in Ohio in normal-traffic (medium) applications. Binder grades for use in heavy- and slow-moving traffic applications are PG 70-22M and PG 76-22M. Under ODOT specifications grades including the “M” designation are polymer-modified binders.

PG 64-28 is used in 442 intermediate courses. It is not required to be a modified-asphalt binder, though it is used in pavements for heavy-traffic use.

A relatively new grade of highly-polymerized asphalt, PG 88-22M, has recently been added to ODOT specifications. This material may be used for a variety of applications. It provides enhanced stability for extreme resistance to deformation (i.e. rutting and shoving), improves cracking resistance and increases pavement strength – allowing for pavement thickness reduction. PG 88-22M is also useful for low-permeability asphalt mixtures used for bridge deck waterproofing.

## Traffic Considerations When Choosing Binder Grade

For ordinary, constantly moving traffic applications, use the standard 441 mix types with PG 64-22. For heavy, constantly moving traffic applications use the standard 441 or 442 mix types with PG70-22M. Where deformation is a particular concern, because of very-heavy traffic and/or conditions that cause traffic to be slow-moving, stopping, starting or turning, use 442, Type A and change the binder type with an "as per plan" note to PG 76-22M or PG 88-22M.

## Item Quantity

Unit price contracts require that the quantity of each type of hot-mix asphalt be determined and provided in the contract documents for bidding purposes. Units of measure used are either cubic yards or tons. Ohio DOT specifications use cubic yards.

## Language for Specifying Asphalt Mixture Composition

Ohio utilizes quality assurance (QA) specifications for the production of asphalt mix. Under QA provisions, prior to the start of mix production for a project, the contractor has the responsibility of developing a JMF and submitting it for approval by the agency. Where an agency is unable to fulfill this role it is beneficial to rely upon the expertise of ODOT by requiring the use of mixtures that have been previously approved by the department. To accomplish this the following contract language is suggested:

“Compose the asphalt mixture with aggregate, asphalt binder, and modifiers (if specified) meeting Ohio Department of Transportation

(ODOT) requirements. Prior to producing asphalt mix for this contract, submit a Job Mix Formula (JMF) for approval.

"Include in the JMF the mix type proposed for use, aggregate source, type, and gradation, percentage of asphalt binder by weight of mixture, grade of asphalt binder, description and source of modifier (if being used), and unit weight of the mixture. Use a JMF that meets all requirements established in this contract and has previously been approved for use on ODOT work.

"Where no previously approved JMF is available, develop one meeting all criteria established in this contract and have it reviewed and approved by an independent testing laboratory prior to submission to the owner representative. The person

performing the review for the testing laboratory must be of its employ and be Level 3 Asphalt Concrete Mix Design Technician approved by ODOT."

It remains necessary that the agency verify that the JMF submitted is for the mix type desired for the given traffic condition.

### Method and Point Of Acceptance

QA provisions require the contractor to perform quality-control testing during the production of the asphalt mixture. Acceptance testing and monitoring of mix production are performed by the owner agency. The ODOT specifications detail these requirements. For local agencies, however, it may be necessary to modify the method and point of mix acceptance. The following additions to the contract language are provided:

#### Suggestion 1:

"Acceptance of the mixture will be in accordance with Ohio Department of Transportation (ODOT) procedures, except that an independent testing laboratory will perform the testing and report the data to the owner's representative for the purpose of determining the pay adjustment. The person performing the testing must have a current Level 2 Asphalt Quality Control Technician approval from ODOT. Include the cost for the acceptance testing in the price per unit of mix."

#### Suggestion 2:

"Acceptance of the mixture will be based upon the owner representative's observation that production and quality-control operations are resulting in an acceptable product."

#### Suggestion 3:

"Certify that the mixture was produced according to the approved JMF within the production control and composition tolerances of the specification."

### Specialty Mixes

There are many specialty mixes available to treat a variety of pavement conditions. Modifiers such as polymers, fibers and stiffeners play an important role in enhancing mix performance. Provided below is a sampling of such mixtures.

**For preventive maintenance (pavement preservation) surface treatments:** Thinlays (thin-asphalt overlays) have been used over the past 30 years with very good success. Smoothseal, a fine-graded polymer-modified asphalt mixture, can be specified for



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pavements having good structural integrity and only the need for surface restoration. ODOT Item 424, Fine-Graded Polymer Asphalt Concrete, outlines the mixture requirements.

For other pavement preservation thin-overlay applications, FPO has developed a Thinlay Asphalt Concrete specification for mixes intended for thin overlays on a variety of traffic applications from heavy to ultralight. These mixes are intended to improve performance in Thinlay applications over standard mixes.

**For rutting resistance:** Stone mastic asphalt, ODOT Item 443, combines high-internal-friction mixes with polymer binders to resist deformation induced by heavy truck loads in high-stress areas. Fiber-modified mixtures and mixtures using stiffeners, ODOT Supplemental Specifications 826 and 857 have also demonstrated effectiveness.

**For longer life:** The use of polymers as a mix additive has proven very successful. Ohio has experience with pavement surfaces lasting as long as 29 years when latex polymer (SBR) has been used in the hot-mix asphalt. SBS polymer-modified mixes are similarly promising, as well, ground tire rubber (GTR).

**For low-volume traffic roads and streets:** FPO has developed a specification known as 404LVT to provide a 404-like, fine-graded mixture especially suited to use on low-traffic volume roadways. The specification 404 LVT is based on ODOT's historical mix formulations and can be found on the FPO website. Alternatively, an agency might choose a Thinlay Asphalt Concrete mix formulated for light or ultra-light traffic or a mix designed under SS 823.

## Conclusion

Item specifications typically used in Ohio local government projects and commercial paving work are those established in the ODOT C&MS. The ODOT specifications commonly used for surface and intermediate courses are Items 441 and 442 – for base courses, items 301 and 302.

Contract specifications need to clearly convey the intent of the agency/owner. This is accomplished by ensuring that the following information is communicated to the contractor:

- Project dimensions & course thickness
- Item specification under which material will be placed
- Description of material
- Item quantity
- Language for specifying asphalt composition
- Method & point of acceptance, and
- Sometimes, the grade of binder and traffic designation.

An example item description is: 441, Asphalt Concrete Surface Course, Type 1, (448), PG 64-22

Under ODOT's QA specifications, the responsibility for development of the job mix formula, and the quality control during mixture production lies with the contractor. The agency approves the contractor's mix design and performs the acceptance testing.

Specialty mixes are available to treat a variety of pavement conditions. Preventive maintenance, high-stress areas and increased pavement life are all instances where modifiers have demonstrated good success.

*All reasonable care has been taken in preparation of this Bulletin. However, Flexible Pavements of Ohio can accept no responsibility for the consequence of any inaccuracy that it may contain.*

## References:

- Pavement Design Manual, July 2014 with revisions, Ohio Department of Transportation
- Construction & Materials Specifications, 2016, Ohio Department of Transportation Asphalt Institute publication MS-26, Asphalt Binder Handbook
- Asphalt Institute publication MS-2, Asphalt Mix Design Methods
- QA/QC Presentation, William Fair, P.E., Flexible Pavements of Ohio
- Asphalt Pavement Design & Construction Guide, February 1, 2000, Flexible Pavements of Ohio
- Thinlay Asphalt Concrete (20January2016)
- Item 404-LVT (LowVolume Traffic) Asphalt concrete 95June2015)





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# Online Pavement Design Tool

## PaveXpress Updated with Version 3.0



PaveXpress, the free, web-based pavement design tool, has been updated to version 3.0 with

new modules for estimating material costs and conducting a layered elastic analysis of a pavement structure. The new modules build on PaveXpress's existing tools for designing new pavements, as well as asphalt overlays for maintenance and rehabilitation. The update also includes an improved user experience, particularly on smaller screens such as smartphones.

PaveXpress — [www.PaveXpressDesign.com](http://www.PaveXpressDesign.com) — creates technically sound pavement structural designs for asphalt and concrete pavements based on widely accepted industry standards. It is designed for use by local agencies, engineers, architects, consultants and engineering students who need a reliable way to quickly determine the necessary pavement thickness for a new roadway or overlay, to estimate roadway materials cost for a project, or to analyze the stresses, strains and deflections in a layered elastic system.

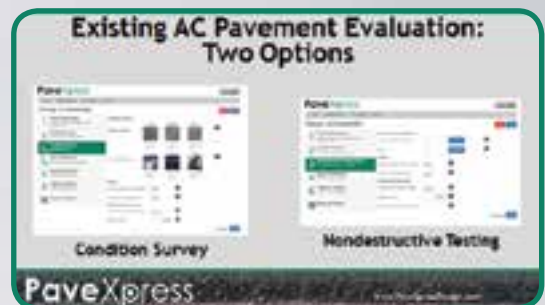
As with its pavement design and overlay modules, the new PaveXpress modules allow users to customize inputs to match locally calibrated data, while providing industry-accepted defaults where appropriate. Context-sensitive help and guidance tools are available at every step of the design process.

PaveXpress is based upon design equations from the 1993 American Association of State Highway and Transportation Officials (AASHTO)

Guide for the Design of Pavement Structures and the 1998 Supplement to the AASHTO Guide for the Design of Pavement Structures. It supports the design of new asphalt and concrete roadway pavements, asphalt overlays and heavy-duty asphalt parking lots. The new layered elastic analysis module is based upon the established Everstress mechanistic tool developed at the Washington State Department of Transportation.

Projects created in PaveXpress can be printed, shared and saved, and design options can easily be evaluated in a side-by-side comparison. As a browser-based tool, PaveXpress can be accessed from any computer or mobile device, regardless of screen size or operating system.

Since its introduction in September 2014, there have been more than 15,000 registered users of PaveXpress, including users at state and federal departments of transportation, local agencies, tollway authorities and educational institutions.







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## ODOT 'All In' Asset Management

# Item 424, Fine-Graded Polymer Asphalt (aka Smoothseal) Playing Large Role

The 2014 Ohio Transportation Engineering Conference (OTEC) was the occasion for the announcement of an initiative that would have momentous impact on Ohio's contractors. In a presentation titled "Transportation Asset Management Planning in Ohio," the Ohio Department of Transportation (ODOT) announced it would be implementing a system-wide asset management philosophy.

The success of asset management is predicated on a pavement preservation methodology that ensures the "right treatment is placed on the right road at the right time." Accomplishing that daunting task requires data – and lots of it. Not only do you need data, but the data must be an accurate representation of the overall condition of the pavement. Pavement condition ratings (PCR) are taken for this purpose. The PCR number of a pavement is a composite score of multiple distress ratings (i.e. raveling, bleeding, patching, etc.). However, consideration needs to be given to the severity and extent of individual distresses. Failing to ensure no individual distress is too severe or extensive will result in localized failures of preservation treatments.



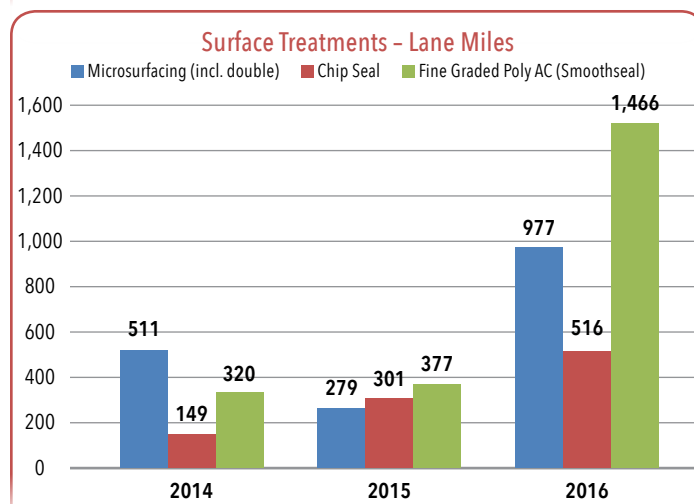
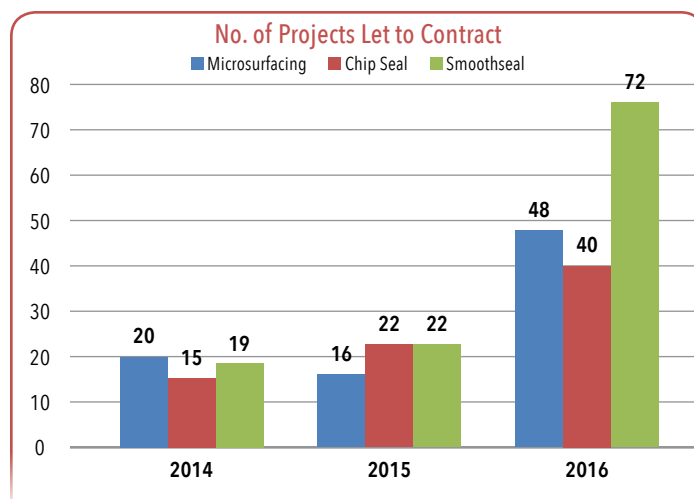
Asset management is essentially an optimization process of evaluating costs associated with treatment of a pavement of a given condition using multiple preservation

scenarios. Accurate costs and life of preservation treatments are components of the optimization. Cost is based on applying historical construction bid data to pre-determined treatment scenarios. Pavement life is determined by modeling rates of deterioration using condition rating data of past treatments placed. Undergirding these is an extensive historical database.

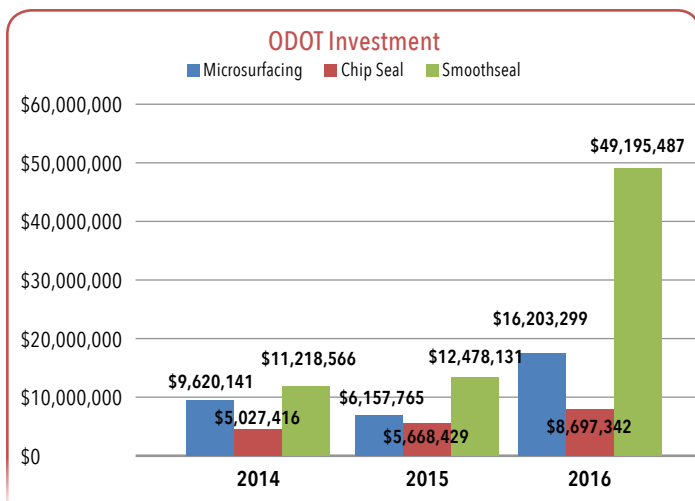
The success of asset management stands or falls on accurate forecasting. Given all the varied pavement conditions of roads – and changing factors such as loads, climate and costs – it's a challenge to get the right treatment on the right road at the right time.

### Item 424, Fine-Graded Polymer Asphalt (aka Smoothseal) Playing Large Role

ODOT's dedication toward asset management was easy to see in the 2016 construction season. True to its word, pavement preservation treatment usage significantly increased. Chip seals, microsurfacing and Fine-Graded Polymer Asphalt were the primary roadway preservation treatments used. Analysis of usage of the treatment types showed Fine-Graded Polymer Asphalt (aka Smoothseal) as being the workhorse for the department. Smoothseal had the greatest number of projects contracted, greatest number of lane miles and highest financial investment.



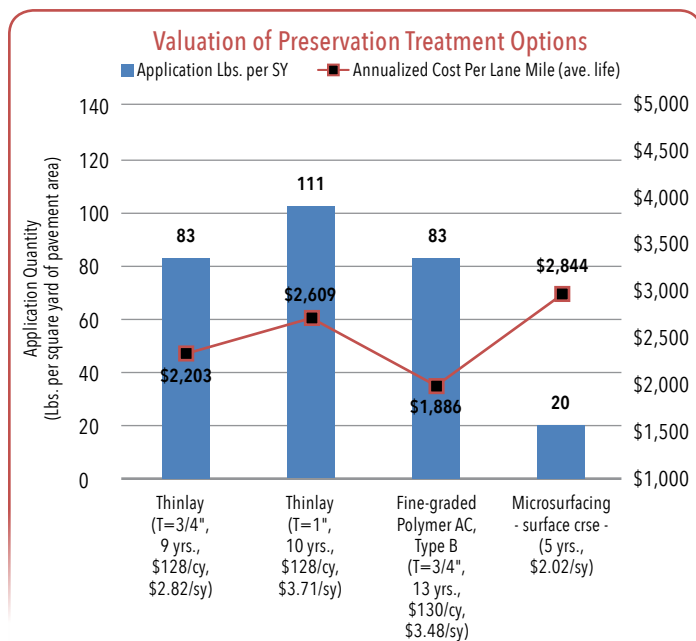




The increased emphasis on pavement preservation in Ohio has ratcheted up the interest in thin-lift asphalt preservation treatments, such as Smoothseal. In a similar manner to the development of Smoothseal, Flexible Pavements of Ohio's

Technical Committee developed "Thinlay." Thinlay is for those applications where a microsurfacing or chip seal would be considered.

Not typically considered in a preservation treatment-selection process is the robustness of treatments. For example, a thinlay placed  $\frac{3}{4}$ -inch thick yields 83 lbs. of asphalt mix per square yard. A single-course microsurfacing treatment is approximately 20 lbs. per square yard – about 75 percent less material. The cost differential is approximately 80 cents – with the thinlay having the greater initial cost. However, that initial cost is



only 40 percent more than the microsurfacing. When considering factors that reflect value received, treatment robustness is often overlooked.

### The Future of Asset Management

A national survey recently conducted for the National Asphalt Pavement Association asked state departments of transportation and other road authorities to identify their most significant challenges. Among the notable responses was the need to manage "big data." Drilling down, responses revealed the need to manage "big data" revolved around a movement toward utilizing asset management. It is becoming apparent that utilization of asset management is increasing, and with the increase will come a greater use of pavement preservation strategies. Whether it is Smoothseal or thinlays, the asphalt industry is positioned to meet the needs of future preservation markets.

Charts and graphics compiled by FPO.



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# Mark Your Calendars



## Ohio Asphalt Expo

**March 14-15, 2017**

Columbus/Polaris Hilton Hotel  
8700 Lyra Dr., Columbus, Ohio 43240

The Asphalt Expo is Ohio's premier asphalt pavement event with multiple concurrent educational sessions and an indoor and outdoor trade show and exhibition. If you construct, inspect, manage or maintain local or private transportation infrastructure, the Ohio Asphalt Expo has the information you need to ensure a successful, long-lasting asphalt pavement.

Visit the Expo website at [www.ohioasphaltexpo.org](http://www.ohioasphaltexpo.org) for more information.

## Field Quality Control Supervisor Training

**March 23, 2017**

Crowne Plaza Hotel Dublin  
600 Metro Place N., Dublin, Ohio 43017

This seminar provides the training required to become approved to perform the Field Quality Control Supervisor (FQCS) function required under ODOT specifications, or to acquire re-approval after five years since the previous training. This session will include training to become approved in performing porous asphalt pavement construction.

Visit FPO's website at [www.flexiblepavements.org](http://www.flexiblepavements.org) for more information regarding this event.



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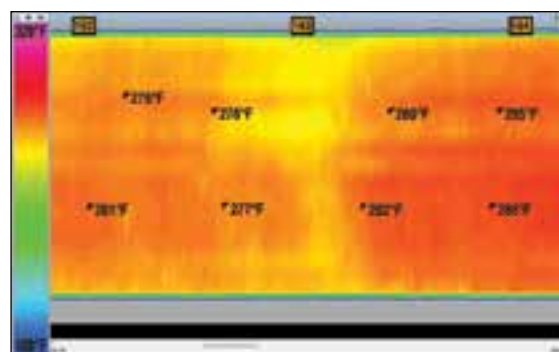
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