TEA-21
Reauthorization: Is the End Near?

OTEC Plays Host to HMA Experts

PSAC Recap: No Bias in Ohio’s Pavement Selection Policy

Members of the Pavement Selection Advisory Council listen to the neutral third party report on how Ohio’s use of asphalt is right in line with other states. See story on page 10.
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Welcome to Ohio Asphalt!

Welcome to this first edition of Ohio Asphalt! I am so very pleased that Flexible Pavements of Ohio is able to provide what we think will be a first-class publication on Ohio’s hot mix asphalt pavements. We are able to do this through the generous support of those who advertise within these pages. Ohio Asphalt will enable us to provide information on technical developments within the HMA industry, research efforts, new products, Association and member news, and interesting articles on recent and innovative projects.

The Association’s present newsletter, Ohio Hot-Mix Asphalt Current News, has been reformatted into a periodic electronic publication and is available on the FPO website at www.flexiblepavements.org. It provides up-to-the-minute information in a more concise and bulleted format. The first issue of the new Current News debuted last November.

“Ohio Asphalt will enable us to provide information on technical developments within the HMA industry, research efforts, new products, Association and member news, and interesting articles on recent and innovative projects.”

Over the years the Association has published several newsletters, starting with Your Thoroughfare in 1944 which ran until the early ’50s. This was replaced by a publication called Flexible Pavements in 1966 that was published until the early ’80s. Ohio Hot-Mix Asphalt Current News debuted in 1992 and was published quarterly until its recent conversion to electronic format.

We hope you enjoy Ohio Asphalt and find it informative and of service. Any suggestions for improvement would be appreciated.

Please let us know if you would like to be added to our mailing list for Ohio Asphalt, or receive notification of the posting of Current News to our website.
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The hills on Ebenezer Road in Hamilton County make for prime conditions to test rubberized open-graded friction course materials. See the article, beginning on page 16, on what other areas in Ohio are implementing OGFC and see if it’s right for your area roads.
Flexible Pavements of Ohio’s
Annual Meeting & Equipment Exhibition

March 3–4, 2004

We are pleased to announce the 42nd Flexible Pavements of Ohio Annual Meeting, Equipment Exhibition and Trade Show. This year’s Annual Meeting will again be held at the Ramada Plaza Hotel and Conference Center, Columbus, Ohio. Our asphalt industry convention brings together vital industry issue updates and networking opportunities all in one location.

General & Technical Sessions - Topics
- Federal Funding Update
- Federal Funding ... What’s in it for Ohio?
- Pavement Selection The ODOT Way ... Implementing the NTP’s Recommendations
- A Look at the New “Ohio Asphalt” Magazine
- Asphalt vs. Concrete War Update
- Warm Mix Asphalt Technology
- Building a Project Using ODOT’s New Incentive Thin-lift Smoothness Spec.
- Building Ohio’s First Perpetual Pavement
- Smoothseal™ ... Coming to a Town Near You
- ODOT Specification Update for 2004

Concurrent Seminars

March 2 & 3: Jim Scherocman’s important and popular seminar, “Quality Asphalt Paving.” This is the critical seminar for asphalt paving engineers, inspectors, superintendents, foremen, operators and laborers. Jim covers all aspects of HMA production and placement that affect quality and economy.

March 3: “Overview of Pavement Rehabilitation for Pavement Managers.” Wayne Jones of the Asphalt Institute overviews all the concepts and techniques of pavement rehabilitation that those managing streets, roads or parking lots need to understand.

And, enjoy the Trade Show Cookout-Style Luncheon, Chairman’s Reception, Scholarship Presentation Breakfast and Paving Awards Luncheon.

Registration Form
Get the registration form for the Annual Meeting and Seminars at www.flexiblepavements.org or call toll free, 1-888-4HotMix.
In many respects, 2003 was an outstanding year. It started off with passage of the Ohio Department of Transportation (ODOT) Biannual Budget Bill which included a multi-year, gas-tax increase for ODOT and additional local agency revenue garnered from incrementally removing payment for the State Highway Patrol from gas-tax revenues.

While this only provides for a continuation of the current level of highway reconstruction at ODOT, it puts Ohio far ahead of most states. At a recent trade show a consulting engineer from a neighboring state told me that his DOT has not only failed to put out any new engineering contracts but has told him to stop working on the ones he has because they do not have money to pay him. Many other states that do not have a constitutionally protected highway revenue stream, such as Ohio has, have robbed highway programs to plug budget shortfalls resulting from a faltering economy. The bottom line is that the highway program in Ohio is much better off than programs in most other states.

There are many to thank for this. Governor Taft heads the list for proposing and pushing the transportation financing plan. House and Senate leadership supported the plan. Representative Steve Bueher championed the cause as the bill moved through the Ohio House. While FPO and many of the construction, labor, engineering and governmental associations worked hard on the bill, in my view the Ohio Contractors Association was clearly the engine that pulled this train. We all owe Clark Street and Angela Van Fossen a debt of gratitude for their leadership and hard work.

As I stated before, this only keeps the status quo. We must have increased revenue at the federal level if we are to move Ohio’s highway program forward. This has to be our top priority for 2004 (see TEA-21 Reauthorization, page 9).

In many respects, 2003 was a good year; however, it was also undoubtedly the most bizarre I have ever seen.
Showing great wisdom, the legislature chose to not get directly involved and instead amended the ODOT Budget Bill to create a Pavement Selection Advisory Council and a Neutral Third Party (NTP) to review ODOT’s pavement-selection process and recommend changes. Through all of this, an assistant ODOT director lost her job, the print media had a field day and total chaos reigned supreme. Fortunately the gas-tax increase was enacted in spite of the OCCA allegations of ODOT bias.

Shortly after the ODOT Budget Bill passed, OCCA wrote a letter to Gov. Taft accusing ODOT Director Gordon Proctor of using his position to “punish” OCCA staff and industry for challenging the Department in the legislature. Director Proctor responded in writing, denying the accusation and suggesting that if OCCA has any allegations against him to “… take them directly to the Ohio Inspector General.” OCCA did just that and filed a seven-page complaint requesting an official investigation into Director Proctor’s conduct and activities regarding retaliation against OCCA and denying OCCA access to public records. Also added to the investigation by Director Proctor were the allegations that Wray’s activities were improper and ODOT’s pavement selection process was biased. In August, the Inspector General cleared ODOT of any wrongdoing, completely exoneration former Director Wray and found that “in this case, there is no credible evidence that there has been favoritism in the process of pavement selection.”

Starting in July, the NTP review of the ODOT pavement-selection process began amid new bias allegations by OCCA. The review ended in December with the issuance of a report finding no bias and recommending some minor changes to the ODOT pavement-selection process (see related article, page 10). OCCA then took issue with the NTP’s characterization of its recommended changes as “minor,” claiming they were major. In any event, ODOT will implement most of the changes in 2004 with the rest as soon as practical. Time will tell if any pavement selections will go from asphalt to concrete, but from our perspective we will continue to strive to provide a superior and more economical product and in so doing, the rest will take care of itself.

While these two issues consumed most of FPO’s time and resources during 2003, the Association was still able to provide its usual educational offerings including two Smoothseal Demonstrations. Ohio’s first perpetual pavement project finished up and another one got underway. Both of these are on Interstate 77 in ODOT District 4.

2003 turned out to be a very trying and stressful year but our resolve remains strong. We all look forward to working on increasing federal transportation revenue and other productive projects during 2004.
Yeh, yeh asphalt costs less during initial construction, requires less maintenance and can last 50 or more years, but what about the way it photographs?

Asphalt has become a media darling; or if you will, an angel of advertising.

Recently, asphalt has been used to help sell anything from muscle, luxury and sports cars to Internet job markets.

From hardcore to hard rock, asphalt has been used as a vehicle to get the message out on products. Here are just a few of the marketing lines asphalt has helped promote:

“The asphalt gods are smiling.”
- BMW automobiles

Formerly, the manufacturer promoted its autos with the phrase: “Perhaps the single greatest contribution to highway improvement since asphalt.”

“Kicking Asphalt, in search of the best party town”
- Bacardi Red Hot Road Trip

“The road to success is paved with asphalt.”
- cruelworld.com job postings

“Kick some asphalt!”
- Dayton tires

“39 years of Asphalt Attitude”
- Ford Mustang

“I love the smell of asphalt in the morning.”
- Goodyear tires

“Same Great Cars … Brand New Asphalt”
- Kentucky Speedway

Why is asphalt so popular in selling anything from tires to cars? It’s all about image; asphalt is synonymous with smoothness, it’s environmentally friendly because it is recycled so much, and everything appears sleeker in black.
Enacting legislation in Congress is more like a marathon than a sprint. Many, if not all, contractors in Ohio over the last several years have been urged, cajoled and pressed to contact their member of Congress on the need to pass an adequately funded, multi-year TEA-21 reauthorization bill. While it seems that we have all been at this for a very long time, now is not the time to let up. On the contrary, Ohio contractors should step it up a notch as Congress nears final decisions on the next highway reauthorization bill.

When Congress adjourned at the end of 2003, Ohio contractors received a hint of what the Hot Mix Asphalt (HMA) market could look like over the next six years. The Senate Environment and Public Works Committee approved a bill that would spend about $255 billion for highways, which is $60 billion more than the Administration’s “stand pat” SAFETEA proposal. The House Transportation and Infrastructure Committee introduced its bill, TEA-LU, which provides $299 billion for highways over the next six years. Clearly, the National Asphalt Pavement Association (NAPA) and the rest of the transportation construction industry support TEA-LU. What does it mean for the Ohio contractors? If TEA-LU was enacted into law, it would provide $9.3 billion over six years to maintain, rehabilitate and construct Ohio’s roads and bridges. In terms of jobs, TEA-LU would create and sustain 60,000 new transportation-sector jobs alone in Ohio, creating 103,000 jobs in 2009.

That is the good news. The not so good news is TEA-LU has a long way to go in the legislative process before it is enacted into law. Despite all the benefits TEA-LU would provide in terms of economic growth, reducing congestion and providing for the nation’s defense, there are some powerful members of Congress who oppose the legislation.

Ohio contractors cannot take TEA-LU for granted. This is no slam-dunk. We are in the middle of a marathon to get this legislation enacted into law. NAPA and Flexible Pavements of Ohio need each and every one of you to personally pick up a phone, dial your member of Congress and say, “Please support and co-sponsor H.R. 3550, TEA-LU!”

Secondly, NAPA is again hosting a Transportation Construction Coalition (TCC) Fly-In, Feb. 24-25, 2004, in Washington, DC. This is your opportunity to talk to the Ohio congressional delegation and their staff about transportation funding issues, just as Congress votes on legislation that will establish your company’s HMA market for the next six years.

The Fly-In is an important part of NAPA’s efforts to pass an adequately funded, multi-year, TEA-21 Reauthorization bill. The 2004 TCC Legislative Fly-In will take place at the Hotel Washington in Washington, D.C. In addition, NAPA and American Road & Transportation Builders Association will be hosting a special reception on the evening of Feb. 23, at the new America on the Move transportation exhibition at the Smithsonian’s National Museum of American History. Contact NAPA or Flexible Pavements of Ohio if you need additional information about these events.

Ohio’s congressional delegation will play a pivotal role in enacting an adequately funded, multi-year highway bill. That means your role as constituent is as important as ever. This is not the time to leave it to the other guy. Contacting your member of Congress and attending the TCC Fly-In will help us get to the finish line and secure your financial future for the rest of the decade.

Jay Hansen can be reached at jhansen@hotmix.org.
The scene for perhaps the most significant chapter in Ohio’s asphalt vs. concrete pavement debate was set when the Ohio Legislature decided that a neutral, third party (NTP) of engineering consultants would examine Ohio’s pavement-type selection process.

Bombarded with contradicting information, the Legislature decided this was the best way to separate the rhetoric of business interests from the facts, and shed light on this seemingly never-ending controversy. Finally, the issue of the Ohio Department of Transportation’s (ODOT’s) perceived bias towards asphalt would be settled once and for all.

It began in spring 2003, as the Ohio Legislature was debating the details of the state’s biennial transportation budget as part of House Bill 87. The stakes for anyone in the highway construction industry couldn’t have been higher. The only chance for significant road construction funding for the next two
years would come from a proposed increase in Ohio’s gas tax. It was time for unity among groups that typically compete against each other for pieces of the transportation funding pie. Without a gas-tax increase there would be no pie.

The Ohio Concrete Contractors Association (OCCA) viewed this as an opportunity to parade witnesses before the House Finance Committee, testifying that ODOT is biased towards the use of asphalt and that Ohio’s practices are out of step with the rest of the country. The OCCA proposed a legislated set-aside of a portion of all pavement spending for concrete.

Fortunately the gas-tax increase was included in H.B. 87, despite this distraction. The OCCA’s proposed earmarks were denied. However, the legislature felt that this pavement selection issue warranted further investigation. As such, the creation of the Pavement Selection Advisory Council (PSAC) was legislated.

The PSAC would include representatives of Flexible Pavements of Ohio (FPO), the OCCA, ODOT and others appointed by the Legislature. The council was charged with hiring a NTP of engineering consultants to analyze Ohio’s pavement-selection process, and to compare Ohio’s practices with those of other states, the Federal Highway Administration and the American Association of State Highway Transportation Officials.

In July, a field of several consultants responded to the request for proposal. PSAC members finally agreed that ERES Consultants from Champaign, Ill., should receive the $200,000 contract. The NTP spent September interviewing FPO, the OCCA and ODOT officials in an effort to better understand Ohio’s current system.

One issue of contention was the selection of states to be analyzed in the study. It was agreed that 10 states were the most the NTP could thoroughly study and still finish by December. The wrong 10 states could slant the findings in either direction. Eventually consensus was reached and Illinois, Indiana, Maryland, Michigan, Minnesota, New York, Pennsylvania, Washington, Wisconsin and the Canadian province of Ontario were selected based on their similarities to Ohio in climate and traffic volume.

The NTP visited each of these states, meeting with DOT personnel in an effort to understand their state’s pavement-selection process so that it could be compared and contrasted with Ohio’s. When the results of these visits were revealed in the final report, it became apparent that every state selects its pavement a little differently. When Ohio was compared with the group, it was shown to “fit right in” with the other states, according to the NTP.

The NTP observed that the most noticeable difference in Ohio’s process was the use of a matrix to assign points to various factors considered in selecting pavement types. All of the other states examined used a system that resembled the process that predated ODOT’s existing system—essentially combining initial cost and future maintenance cost into one “lifecycle cost” category. When the draft report was delivered to the PSAC on November 18, the major recommendation was for Ohio to return to the use of the lifecycle cost model.

Ironically ODOT’s current policy, “Pavement Selection the ODOT Way,” represented an effort to move away from the subjectivity of the method recommended by the NTP. In 2002, both industries had been invited to participate in the creation of the “ODOT Way” in an effort to objectivize and remove controversy from the process.

The NTP admitted that the “ODOT Way” was “innovative” and “attempted to be objective,” but that a return to a more subjective process where “management decisions” are more easily made would put Ohio in line with other states. Since the components of lifecycle cost were included in “The ODOT Way” in similar proportion to the recommended model, it’s not likely that this re-jiggering of the data will cause a significant shift in pavement selection.

The NTP recommends that lifecycle cost be the primary factor in determining which pavement type should be selected if the difference between the two is greater than 10 percent. For situations where the difference in lifecycle cost is less than 10 percent, the NTP specified secondary and tertiary factors to be considered as a basis for a “management decision.”
Other recommendations represented both minor gains and losses for the asphalt and concrete industries, none of which should be characterized as overly significant. However, the OCCA has been quoted in the media, calling the recommendations major and significant. In fact, the NTP characterized the entire body of its recommendations in testimony as “minor, moderate” and “incremental” changes that do not constitute an “overhaul” or “throwing out” of the current system; instead, it recommends a “tweaking” of the current system. Most engineers familiar with pavement selection will recognize that implementation of these recommendations will not change much in terms of the final outcome. The NTP does not call ODOT biased at any point in its report or testimony. This lack of bias is without a doubt the most significant finding – or lack of finding – in the report. We now have a neutral third party of engineering consultants who have looked at Ohio’s process and compared it with other states, finding no bias anywhere. We hope the Legislature will see that allegations of bias no longer hold water and that we can return to debating the merits of pavement type. The asphalt industry has always been comfortable engaging in discussions of the economic and performance merits of its products.

Other recommendations of the NTP include:

**Improve communication.** The NTP calls for an end to the rhetoric between industries and recommends ODOT hire a communications consultant to mediate the industry-dialogue process.

**Implement Alternative Bidding Trial Projects.** The NTP recommends that five to 10 alternative-bid projects be commissioned in the near future to compensate for the allegation that reliable unit costs for PCC are lacking because of its limited usage in Ohio.

**Address Pavement Noise Issue.** The NTP asks ODOT to study noise abatement techniques and to construct test sections for further study.

The entire report, as well as responses from both industries, and transcripts from the entire PSAC process is available online at www.ohiopavementselection.org.
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And The Winner is ...

Recently, a study was conducted for the Ohio Department of Transportation (ODOT) by a neutral third party to analyze its pavement-selection process based on complaints there was a bias for using asphalt. Although the study concluded no bias, a report prepared by the Asphalt Pavement Alliance (APA) shows that Ohio is not the only state that prefers asphalt. Hot Mix Asphalt (HMA) is the predominant choice among all states!

APA reviewed the Federal Highway Administration’s (FHWA) annual Statistics Report, in particular, Section V: Roadway Extent, Characteristics and Performance, to determine the percent of in-service highway pavements surfaced with HMA for each state from 1993 to 2001. The Statistics Report gathers information from each state’s department of transportation annually from the previous year. Table HM-31 of the report shows the number of centerline miles by pavement surface type for the entire federal-aid highway system by state. The surface types are: low (unsurfaced or < 1” thick bituminous layer), intermediate (1” to 7” HMA), flexible (> 7” HMA), composite (bituminous surface over rigid pavement) and rigid (Portland Cement or Concrete). The report is broken down into the following categories: National Highway System (NHS), Interstate System, Rural Interstate System, Urban Interstate System, Other, Rural Other and Urban Other.

According to APA’s review of the FHWA reports, in 2001, 82.48 percent of the NHS was paved in HMA. Other Federal Aid Highways were 95.45 percent HMA, for a combined total of 92.96 percent HMA for the entire country. Ohio ranks 20th for the most asphalt used for both the NHS and Other Federal Aid Highways, at 97.48-percent. Alaska and New Hampshire implement 100 percent HMA. Of the 32 states below Ohio’s 97.48-percent HMA use, none fall below 84 percent, except one – Iowa at 37.58 percent. Most states are above 90 percent in their use of HMA.

The statistics in this report suggest that no matter what changes are made to Ohio’s pavement-selection process; HMA will continue to be the dominant choice, just as it is nationwide.
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The Ohio Transportation Engineering Conference (OTEC) held October 22-23, 2003, served as a gathering point for experts in hot mix asphalt (HMA).

With 2,000 registrants the OTEC event broke record attendance levels, making it one of the largest, state transportation venues in the country. Attending the Asphalt Session were specifiers from ODOT, local governments and consulting engineers, as well as many FPO contractor members who took advantage of the event, meeting with customers and viewing the trade show.

Asphalt played a significant role in the conference, as experts in the HMA industry gathered to share what it takes to make transportation “Safe, Secure & Reliable in the New Economy.”

Presentations at the Asphalt Session covered a variety of topics about new and emerging technology. Dr. Ray Brown, director of the National Center for Asphalt Technology (NCAT), discussed the progress of the Superpave Simple Performance Test (SPT) development. Work on selecting the SPT is nearing completion. The
SPT is the much sought after mechanism that would provide an indication of a mixture’s performance in the field and would set in place the last piece of the Superpave puzzle. Dr. Brown indicated that three test methods are being considered: the Dynamic Modulus Test, the Repeated Load Permanent Deformation Test and the Static Creep Test.

Dr. Rebecca McDaniel also spoke on the Superpave theme. Her topic, RAP (Recycled Asphalt Pavement) in Superpave Mixes, was based on work performed by the North Central Superpave Center. Dr. McDaniel reported that although Superpave’s development did not consider the use of RAP, it could be successfully used as a component of these mixes. Blending of aged RAP binder with virgin binder does occur during the plant mixing process dispelling the notion that RAP is just “black rock.” As well, Dr. McDaniel’s research indicates that traditional methods used for determining blending grades are satisfactory for Superpave mixes.

Rounding out the discussion on Superpave was a presentation by Tom Snyder, Marathon Ashland Petroleum, who discussed Superpave binder manufacturing. Snyder’s presentation enlightened listeners as to the complexity in manufacturing and delivering high-quality, performance-grade binders.

At the heart of emerging technology in the HMA industry is Perpetual Pavement. A new pavement design concept, Perpetual Pavement proposes the use of engineering design principles (i.e., mechanistic design) to optimize material selection. This optimization results in an economical pavement structure having inexhaustible structural life with only the need for surface preventive maintenance.

Three speakers, Dr. Sam Carpenter of the University of Illinois at Urbana, Dr. Sang-Soo Kim of Ohio University, and Jeff Wenger of Northstar Asphalt gave their perspectives on Perpetual Pavement.

Dr. Carpenter led the discussion with his research validating the Perpetual Pavement design concept. His research clearly showed that an inexhaustible structural life is achievable. That is, there is a limiting thickness whereby truckloads can pass perpetually without causing damage to the asphalt pavement’s structural strength.

Ohio University has been a key partner in Ohio’s development of a Perpetual Pavement specification. Dr. Kim performed much of the research for the Ohio specification. His presentation discussed the development process, the basis for Ohio’s Perpetual Pavement thickness methodology, and what material properties will be evaluated in ODOT’s coming Perpetual Pavement project on US Route 30 in Wayne County.

The final link in the chain of Perpetual Pavement speakers was Jeff Wenger. Northstar has the distinct honor of being Ohio’s first contractor to build a Perpetual Pavement. Wenger’s presentation singled out production and placement issues with building Perpetual Pavements. Conventional methods can be used, however, greater attention must be paid to ensure uniform mixture texture, since large stone mixes are being used. For those of you who missed it, you can hear Wenger’s presentation at FPO’s 42nd Annual Meeting, Equipment Exhibition & Trade Show, March 3-4, 2004.

A final feature of this year’s OTEC was a luncheon for all university professors and students participating in the FPO Scholarship Program and Mix Design Competition. The luncheon served as an opportunity for Ohio’s asphalt industry to say thank you to universities for their support of asphalt education and research. We are especially grateful to Dr. Ray Brown for serving as our luncheon speaker. Besides his wealth of HMA knowledge, Dr. Brown’s work at the NCAT to teach the teachers about HMA has done much to advance asphalt technology at Ohio’s major universities.
Open-Graded Friction Course

While hot mix asphalt (HMA) surfaces generally provide good skid resistance, some agencies are confronted with adverse geometric conditions that can benefit from high-friction properties. These locations may be steep grades or curves, often at intersection approaches that experience abnormally high rates of wet pavement accidents. A number of Ohio agencies have found relief by using a specialty mix, Rubberized Open-Graded Friction Course (OGFC), to provide high skid resistance and superior surface drainage.

Properties of OGFC

The most common HMA mixtures are dense-graded mixtures designed to be impermeable to water. By contrast, open-graded friction courses are formulated to result in an internal structure of interconnected voids that allow water to drain through the mix. This is accomplished by using an open gradation of aggregate that lacks the mid-sized aggregates that would fill the voids between the coarse...
aggregate particles. This gradation is bound by a heavy coating of tough, polymer-modified asphalt that makes the mix durable, despite its internal exposure to air and water.

The internal drainage properties of OGFC prevent water from standing on the surface and are used to reduce hydroplaning and splash and spray from tires. This surface also has the benefit of less glare from headlights and more visible pavement markings on rainy nights.

OGFC surfaces are also the quietest pavement surfaces known. The open voids in the mix attenuate noise like no other surface. OGFC is sometimes used solely to reduce traffic noise in particularly sensitive areas.

It is generally believed OGFC requires more treatment to prevent icing. Since water drains through the OGFC, brine does not spread across or stay on the surface. OGFC also performs differently thermally speaking than dense-graded mixes. As a consequence, OGFC may require more frequent applications of salt. OGFC’s durability can be compromised, if the material is not formulated to prevent damage from the exposure to air and moisture. However, experience in Ohio with the highly polymer-modified binder that is required by the ODOT specification, has generally been very satisfactory.

ODOT’s specification for RUBBERIZED OPEN-GRADED ASPHALT FRICITION COURSE, is Supplemental Specification 803. SS 803 requires a crushed, air-cooled slag coarse aggregate and an overall gradation with 100 percent passing the 1/2-inch sieve and less than 17 percent passing the #8 sieve. You could think of this gradation as a Type 1 mix with most of the sand omitted. The binder is specified as a PG 58-28, modified by the addition of 5 percent rubber solids. Under SS 803, the ODOT laboratory determines the mix design or Job Mix Formula for the specific combination of aggregates and binder. ODOT’s mix designs have typically resulted in total binder contents of around 7.5 to 8 percent.

ODOT provides the following note to guide its designers in the use of OGFC:
A) Use where surface water drainage is a concern, a high-skid condition exists or it is desired to control sound in abnormally high-sound problem areas. B) This product uses only air-cooled slag, so check on availability and cost for your area. C) Use 0.75-inch lift on an existing or new 446 or 448 Type 1 or 442 9.5 or 12.5 mm asphalt course. D) Do not apply over milled surfaces. Apply over surfaces that have sound aggregate and no visual evidence of stripping. E) When selecting for use, be careful if applying low-tonnage applications. The best production product is achieved in quantities of at least 300 tons. F) No special maintenance or traffic considerations.

OGFC mixes are designed using an aggregate blend of the specified gradation and asphalt drain-down and abrasion-loss tests to determine optimum asphalt content. Mixes are usually tested for moisture susceptibility. Final air voids in the mix are required to be a minimum of 18 percent.

**Centerville Experience**
The City of Centerville placed a rubberized open-graded friction course on Clyo Road on the approach to Alex-Bell Road about 10 years ago. The project was an ODOT-funded reconstruction of the existing roadway. The new pavement was a 10-inch, full-depth, asphalt design with an OGFC surface. The area treated with OGFC is an excessive grade, more than 7 percent. Because of the grade, the project required a design exception. The OGFC was placed as a mitigating treatment for the excessive grade. Mary Lou Pence of the Centerville engineering office reports that the pavement has performed satisfactorily and is still in service.

**Kettering Experience**
The City of Kettering also placed an OGFC on Stoop Road, from Far Hills to Tate, nearly 10 years ago. According to Al Fullenkamp, public service director/engineer for the city, it has performed well, providing good, skid resistance, but is now showing the wear and tear of time and traffic. Therefore, the city is planning its resurfacing. Fullenkamp noted that the OGFC has taken a lot of salting to keep it de-iced.

**Hamilton County Engineer’s Experience**
Hamilton County is on its second generation of using OGFC on the hills of Ebenezer Road, from Muddy Creek to Oakhaven, in western Hamilton County.
The road was first surfaced with OGFC nine years ago. Pat Ashcraft of the Hamilton County engineer’s office says that the material has served well enough that the county resurfaced it with OGFC again in 2002. The cost of the mix in 2002 was $159.50 per cubic yard. The county is planning another project for a steep grade on Anderson Ferry Road in 2003.

**Cincinnati Experience**

In 2003, the City of Cincinnati placed OGFC on a curve on Columbia Parkway, west of Delta Avenue. The contractor was Barrett Paving and the bid price was $200-per-cubic yard for a bid quantity of 60 cubic yards. Joe Flading of Cincinnati Engineering said he drove it in a hard rain and that it seemed almost as if it wasn’t raining on the OGFC.

**Special Considerations**

There are several cautions that must be observed in the use of OGFC. First, there is the expense of producing any special mix in a small quantity. Switching the plant to use special aggregates and binders entails a lot of cost that must be spread over the quantity to be produced. The air-cooled, blast furnace (ACBF) slag aggregate required by ODOT specifications is generally only available in northern and eastern Ohio, West Virginia, Detroit and Chicago areas where steel making has occurred. Costs of producing and transporting the aggregate are higher than for locally available aggregates. Also, the PG 58-28 binder specified for SS 803 is a non-standard grade for most Ohio HMA producers. A contractor will have to order a special tanker load of this binder from the asphalt producer and dedicate a separate tank. Lastly, there is the synthetic latex, SBR, rubber additive. The additive is expensive and requires some special equipment to add to the HMA mixing process. All of this adds expense to the production of the mix, and makes small quantities costly. However, large quantities attract low prices. A review of ODOT bid prices indicates that quantities of 300 cubic yards or more generally cost $100 per cubic yard or less.

Cincinnati’s Columbia Parkway provides motorists a quiet ride, better visibility during the night because of less headlight glare, and less chance of hydroplaning during wet conditions because of the use of OGFC.
Drainage must be provided for the OGFC layer. This means day-lighting the course to the shoulders or providing a shallow gutter or slotted drain to provide positive drainage for the water flowing through the OGFC. The OGFC must be kept clean to prevent clogging. High-speed applications tend to be somewhat self cleaning. But, low speed applications may need swept with a vacuum sweeper regularly.

Then there is an issue of durability that depends on the surface on which the OGFC is placed. Water that drains through the OGFC will tend to lay on the top of the intermediate course just below the OGFC. If that course is a new layer of dense graded HMA that was properly designed and compacted, there should be no problem. The dense-graded HMA will be sufficiently impermeable to resist attack by the moisture coming through the OGFC. If, however, the surface is existing weathered asphalt or a milled surface, then the moisture will rapidly attack the porous layer and lead to early failure by raveling or delaminating. To prevent this deterioration, some agencies have placed a chip seal under the OGFC to seal off the underlying surface. Also, there is that issue of OGFC possibly requiring more frequent salting to prevent icing.

**Alternatives**

Using an OGFC eliminates water laying on the surface of the pavement, and that is an important characteristic of its use in reducing wet accidents. But, it may not always be feasible to provide the necessary drainage for an OGFC, such as between curbs or on an inlay. In these cases, perhaps it would be better to use a dense-graded mix with special aggregates that will provide high-friction numbers. The same slag aggregate that provides high-friction numbers in OGFC could be specified in a Type 1 gradation to give high-skid resistance. And there are other special aggregate requirements that could be used to improve the skid resistance of dense graded mixes. SS 854, Smoothseal™, gets its good skid resistance from a requirement that calls for “… natural sand with at least 50 percent silicon dioxide by weight.”

Similarly, skid resistance of mixes could be improved by using very hard, crushed, aggregates like granite or basalt. While these aggregates are not found in Ohio, their importation can be feasible for special applications. Some agencies have found that texturing an existing surface by cold milling serves as a temporary remedy for skidding accident problems. ODOT and Montgomery County have successfully used this technique as a temporary measure on accident-prone curves.

**Summary**

Certain adverse geometric conditions can benefit from using highly skid-resistant surfaces. HMA mixtures can be formulated to meet this requirement. OGFC and dense-graded mixes using special aggregates selected for their high-friction properties can meet the traffic needs in these applications. For more information on OGFC, consult the National Asphalt Pavement Association’s publication, “Design, Construction and Maintenance of Open-Graded Asphalt Friction Courses,” IS 115.
You’ve likely heard of the trickle-down theory. That’s when those of us on the bottom get something good because it overflows from the abundance had by those at the top. Usually we think of this in the context of economics. Well, ECON 101 has just come to asphalt.

Previous issues of Hot-Mix News extolled the virtues of Smoothseal™, a thin-lift asphalt preventive maintenance treatment (officially called Ohio Department of Transportation (ODOT) Item 854, Fine Graded Polymer Asphalt Concrete). Those articles described many of the projects ODOT constructed and continues to successfully construct using Smoothseal™. We are pleased to report that the use of Smoothseal™ is beginning to trickle down.

In the 2003 construction season, Flexible Pavements of Ohio (FPO) in cooperation with ODOT, the City of Englewood, Kokosing
Construction, Barrett Paving Materials, the Asphalt Institute, LTAP, Highway Rubber Products and Marathon Ashland Petroleum hosted demonstration projects to showcase Smoothseal™ to local agencies and highway engineering consultants. Two open houses were held and interest in the Smoothseal™ concept was strong.

The first open house occurred in the Mansfield area and involved the construction of a 1-inch-thick Smoothseal™ overlay on state routes 39 and 430. The project starts at the east corporation limit of Mansfield and continues east to the bridge over Richland IR71 for a distance of approximately 3 1/2 miles. Many local government representatives were present to see Kokosing place an exceptionally smooth-riding pavement.

The City of Englewood played host to the second Smoothseal™ open house. Known for its innovation and effective pavement management, Englewood considers Smoothseal™ an effective preventive maintenance technique that extends the life of their pavements and provides an aesthetically pleasing riding surface. The Englewood open house showcased Smoothseal™, Type B. Where the aggregate used in the Type A material consists entirely of sand, the Type B incorporates minus 1/2-inch material.

Attendees at both open houses learned of the development of Smoothseal™ by Asphalt Institute District Engineer Wayne Jones. Pat Welsh, Highway Rubber Products and Steve Jones, Marathon Ashland Petroleum, also provided information on polymer-modified asphalt cements and their effect on pavement durability and longevity. Lastly, representatives of Kokosing and Barrett Paving discussed placement and compaction issues encountered with using Smoothseal™.

Quick to act on this new-found knowledge was the City of Wooster. Within a few weeks of the demonstrations, city engineers had developed plans and were placing Smoothseal™ on some experimental sections. Kokosing Materials produced the overlay and placement was done by city crews.

As the season was coming to a close and paving crews were winding down, city and county engineers were gearing up and drafting plans for another paving season. Smoothseal™ is a promising new tool in their preventive maintenance toolbox and what is a trickle now may soon sound like the rush of mighty waters.

For more information on Smoothseal™ (What’s it made of? Where’s it best used?) go to the Flexible Pavements of Ohio website at www.flexiblepavements.org and click the link to Technical Documents.
Cold Longitudinal Joint Construction

Which Technique is Best?

Construction of good performing cold longitudinal joints requires the proper equipment and its careful use by skilled operators.

The technique of constructing good performing longitudinal joints continues to be a topic of concern for the asphalt paving industry. The National Asphalt Pavement Association (NAPA) published a manual on the subject in 1997 (2). The National Center for Asphalt Technology (NCAT) has been studying and comparing joint construction techniques since 1992 and has issued four reports of its findings (3, 4, 5 and 6). Manuals on hot mix asphalt (HMA) pavement construction (1, 7) contain guidance on placing and compacting cold longitudinal joints. Still, there is a lack of consensus within the industry on a best technique for constructing good performing longitudinal joints.

The NAPA manual states that, “a variety of techniques have been successfully used to construct good, longitudinal joints.” The NCAT research identifies several techniques that produced better results than others within the scope of its review. There is little agreement between the various manuals of practice as to the proper or best technique. The industry needs practical guidance on straight-forward methods that can produce good results, consistently and economically.

Theory versus Reality
It is universally believed that lack of density or compaction is the reason for porosity and subsequent deterioration at longitudinal joints. It is often supposed that the problem is with the mat placed in the first pass. The unconfined edge of the first pass cannot be compacted to the same potential density as the center of the mat or the confined edge of the matching pass. In theory the confined edge of the matching mat can be compacted to the same density as the rest of the mat, if properly placed and rolled. However, in practice, it is often the matching pass side of the joint that gives the poorest performance. While the first
pass will have an acceptable degree of density, if correctly rolled, it is possible to place the matching pass so that the area next to the joint receives little or no compaction. If the paver operator fails to place enough extra thickness of uncompacted material to roll down to full density or if the extra depth of material is pushed away from the joint by use of a rake or lute, the roller will bridge the matching side of the joint and compaction will not be achieved.

To combat this deficiency, many agencies have, or are contemplating, a density requirement for longitudinal joints; usually about 2-percentage points less than the average required for the mat as a whole. The Ohio Department of Transportation (ODOT) addresses joint compaction by including density measurements taken at the joint in the calculation for determining payment. The approach taken by ODOT will help ensure that the agency is not paying for poor longitudinal joint construction. How the contractor obtains compaction on these projects is not specified. It’s still up to the contractor which technique to use to build good joint density.

So, is there no single method that can consistently produce good performing longitudinal joints, using conventional equipment, without a lot of extra work and expense? We think there is.

**Recommended Technique**

**First pass:** Use a paver that has an end gate that extends all the way to the back of the screed for some confinement of the edge (all pavers built since December 1997, have this feature as a result of a NAPA committee agreement (2)). Operate the screed in the vibrating mode. The extra 10 percent initial compaction may be critical. It is certainly more economical than adding additional roller passes to obtain the same density. Operate the paver in a straight line so the mat has a straight edge that can be properly overlapped with the matching pass. Roll the unsupported edges of the mat as quickly as possible with a double-drum vibratory roller operated in the vibratory mode. Position the roller with the drums hanging in the air about six inches over the edge of the mat. Set the frequency to the maximum. Set the speed so as to obtain 10 or more impacts per foot. Set the amplitude as appropriate for the thickness of the mat (thinner layers require lower amplitude). This technique gives the highest level of compaction possible on the unconfined edge and minimizes cracking and shoving of the material at the edge of the mat. Don’t try to use a rubber-tired roller on this first pass; it will cause the unconfined edge to push out.

**Matching pass:** Tack coat is usually not needed on the vertical face of the first pass, if the material along the joint is clean. If tack coat material is placed, it should be placed uniformly with a distributor. Place the matching pass in a straight line with a consistant overlap onto the first pass of 1 inch to 1 1/2 inches, so as to provide some extra mix to be rolled into the joint. (Note: if the matching pass is placed against a vertical, sawed or milled edge, the amount of overlap must be only about 1/2 inch) Place the proper depth of uncompacted mat to allow for proper roll-down to optimum density and to end up flush with the first pass (this is usually considered to be one and one-quarter the thickness of the compacted first pass). Don’t rake the joint! Roll from the hot side with the rolls of the vibratory roller hanging about 6 inches over the first pass. Use the same roller settings.
as previously recommended. Using a rubber-tired roller may be very beneficial in getting good joint density. Even if the paver operator fails to get just the right amount of thickness or overlap, the rubber-tired roller may be able to get optimum density at the joint. If a rubber-tired roller is used, place the center of the outside tire over the joint.

Summary: Construction of good performing cold longitudinal joints requires the proper equipment and its careful use by skilled operators. Following these procedures recommended here can consistently produce good performing joints with a minimum of extra work and cost.

Of course, mother knows best. She may have once told you to “stay out of those kinds of joints!” This is also good advice with respect to cold longitudinal joints. No joint or a hot longitudinal joint is always preferred, if project and traffic conditions permit. Full-width paving eliminates any joint concerns. Although echelon paving is costly, requiring multiple pavers and their crews, the hot longitudinal joint it produces can be compacted to the same density as the overall mat. A hot longitudinal joint has none of the inherent drawbacks of the best constructed cold longitudinal joint.

Acknowledgement: Ohio Asphalt wishes to acknowledge the assistance of James A. Scherocman, PE, consulting engineer, in the writing of this article. Without Jim’s helpful review and critique this article would not have been possible.

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As it begins its 85th year of service to the asphalt industry, the Asphalt Institute has announced a major reorganization for its Field Engineering staff. The reorganization plan calls for the Field Engineers to be aligned with the five U.S. Asphalt User Producer Groups (UPGs). The announcement out of the Institute Headquarters in Lexington, Ky., assigns at least two of its field engineers to each of the Asphalt UPGs as follows:

Southeast: Mike Huner and Gary Fitts
Northeast: Carlos Rosenberger and Vince Aurilio
North Central: Wayne Jones and Mark Blow
Rocky Mountain: John Duval, Mark Blow and Bob Humer
Pacific Coast: Bob Humer and John Duval

The map below shows the Field Engineer office locations along with each state’s UPG affiliation. This new alignment will allow greater flexibility in bringing the Asphalt Institute’s expertise and talents to where they are most needed. While none of the Field Engineers will be relocated as a result of this reorganization, they will continue to provide key technical support to member companies and specifying agencies based on their new alignment.

Ohio is part of the North Central Asphalt User Producer Group (NCAUPG) that covers 12 states and two Canadian provinces. Contact information for the Institute’s Field Engineers locally is:

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NCAUPG’s Annual meeting was held January 27-29 in Omaha, Neb. For more information on the meeting, visit http://bridge.ecn.purdue.edu/~spave/NCAUPG/Index.html
The founders of The McLean Company began selling pavers and asphalt plants to Cleveland area contractors as far back as the 1930’s as associates of the Barber-Greene Company. By 1946, brothers Don H. and Ken McLean were in business for themselves and have since passed the reins to two subsequent generations. Over the years The McLean Company has grown into a statewide road construction equipment sales and service firm with $20 million in annual revenue.

“Our family and management group is not far from the curb,” said Scott McLean, a member of the family’s third generation. Scott says

The McLean Company sells more large and small asphalt pavers than anyone in Ohio because of its longstanding relationships with customers. He finds himself calling on third-generation managers of companies that his grandfather called on half a century ago. “This is a fun business,” Scott said. “We like the people we work with and we like the people in our industry.”
The McLean Company now provides paving contractors one stop shopping for their milling, in-place recycling, asphalt paving, soil and asphalt compaction needs. We not only provide a wide variety of leading edge design machinery, we also couple it with the best parts and service support in your area. Our product support is second to none.

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Scott McLean also cites an expertise in asphalt and the company’s ability to provide for the needs of both large and small contractor markets as reasons for its success. The McLean Company boasts a 76-percent Ohio-market share in equipment for small commercial and driveway asphalt contractors. Its market share for heavy-highway contractors is 25-35 percent.

The McLean Company operates with about 40 employees working out of offices in Hudson, Columbus and West Chester. It offers a wide array of products, including asphalt plants, asphalt and concrete pavers, compaction equipment, street sweepers, excavators, front-end loaders, chip spreaders, asphalt distributors, asphalt patching equipment, road wideners, milling machines and crack-sealing equipment. Asphalt equipment represents almost three fourths of the company’s business. Product lines available through The McLean Company include Cedarapids, Cimline, GOMACO, Huber, Hyundai, Johnston, Lee Boy, MADVAC, Midland Road Wideners, Patch King, Rosco, CMI-Johnston-Ross of Terex Corp, Sealmaster, Spaulding, US Jetting, Wacker and under the Wirtgen Group of Companies, Vogele America Pavers, Hamm Compaction and Wirtgen America Milling machines.

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In 1976, the family’s second generation, Fred H. and Don K. McLean, took control of the company their fathers built. In 1994, Don S., the son of Don K., became president of the company, also working with customers in the northern half of the state. His sister, Carry Brockman, is now corporate secretary and a sales rep in the Akron/Canton area.

Scott, the oldest son of Fred McLean, describes himself and the rest of his family members as “player/coaches.” Scott calls on customers, travels with the sales staff and works with customers on troubleshooting and quality-paving issues. He concentrates on sales in the southern half of the state. Fred’s middle son, Doug, is branch manager/vice president for the Cincinnati area. Bill, the youngest of Fred’s boys, is the company’s treasurer.

Jim DeHart Jr., the company’s chief operating and financial officer, having worked with both the second and third generations of the McLean family, agrees with Scott McLean’s explanation of the company’s success. DeHart worked for 15 years as a financial consultant for the McLeans before joining the company full-time five years ago. “We have grown considerably from an operations standpoint,” DeHart said.

“The third generation has a definite vision for the company’s future, and a focus on our customer’s satisfaction is the most important source of our success.”

The McLeans are very excited about a recent alliance with the Wirtgen group of companies. The alliance with Wirtgen, which recently purchased Vogele and Hamm Compaction, will add some interesting new products to the McLean Company’s list, including brand-new “foamed asphalt” technology from Eastern Europe.

Scott McLean finds satisfaction in seeing a piece of McLean equipment in action. The recently completed I-670 connection in Columbus is perhaps the highest-profile job done with McLean pavers in 2003. Anyone who lives in or travels through Columbus appreciates this final cog in the state’s highway system, which makes navigating central Ohio a lot easier. “When I see one of our machines doing a job like that, it’s really a feather in our cap,” Scott said.

For more information on The McLean Company, visit: www.themcleancompany.com.
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