PENNDOT OPENS NEW MATERIALS TESTING LAB TO AID RECORD ROAD & BRIDGE REPAIR EFFORT

By Erin Waters, Pennsylvania Department of Transportation Commonwealth News Bureau

Just in time to meet the demands of a nearly $3 billion roadway and bridge construction season, the Department of Transportation recently opened its new highway materials testing lab in Harrisburg, PennDOT Secretary Allen D. Biehler, P.E. announced recently.

Before the new lab was built, PennDOT employees were working in a nearly 100-year-old facility that did not meet the demands of a vigorous testing program.

The new, 107,500-square-foot facility, which is located on the former Harrisburg State Hospital grounds, employs 120 workers involved with the quality assurance and testing of construction material.

The new facility offers an improved HVAC system, backup generators and more space to accommodate testing equipment.

Continued on page 2...
PennDOT typically performs more than 70,000 tests a year on items including aggregate, asphalt, cement, concrete, paint, road salt, soil and steel. More than 13,000 samples arrived in the lab last year, with each sample often undergoing multiple testing processes.

PennDOT’s lab was the first state lab in the nation to receive ISO 9001 certification, which means it meets international standards for quality management. For this certification, the lab must include a set of procedures covering key business processes, monitor processes to ensure their effectiveness, keep adequate records, regularly review the effectiveness of individual processes and the quality system, and facilitate continual improvement.

It also holds ISO 17025 certification related to testing standards and competency of equipment, methods and staff.

The lab also holds accreditations by the American Association of State Highway and Transportation Officials Materials Reference Laboratory and the Cement and Concrete Reference Laboratory.

Construction of the $27.1 million lab began in September 2007. The size and facilities of the new site ensure that the lab will meet modern testing requirements in a low-maintenance facility that will last for years.
First Economic Stimulus Project to Hit Pennsylvania!!
And right in our own backyard! On March 12, GOH was low bid on the first economic stimulus project in Pennsylvania. Within hours of the low bid, Transportation Secretary Allen Biehler was on site for a press conference to kick off the beginning of ARRA projects. Pennsylvania’s $1.026 billion stimulus monies will provide needed repairs to PA roads and bridges and create jobs for our local communities.
Introduction

Permeability of compacted asphalt mixtures is important regarding both water and air permeation. Easy permeation of air through the pavement will expedite aging and hardening of the mixture resulting in brittleness and susceptibility to cracking. Water ingress into the pavement due to high permeability can lead to premature failure of the underlying layers due to stripping and expansion under freezing conditions. The entrapped excessive water can damage the underlying layer due to the imposed pressure from the pumping action which results from deflection under heavy loads.

Permeability is affected by void structure and lift thickness. The effect of lift thickness on permeability is manifested through its effect on void structure in two ways:

- How the change in lift thickness affects the air void content
- How the change in lift thickness affects the void structure and interconnectivity of voids.

These two issues need to be separated because it is possible to have two layers with different thickness levels (of the same mix) but the same air void content delivering different permeability levels. In other words, the thicker layer tends to reduce the connectivity of voids and, therefore, reduces permeability. For case 1 above, the effect of thickness on permeability is reflected through its effect on the air void content. For case 2 above, the effect of lift thickness on permeability is through its effect on the void structure.

A project was sponsored by Pennsylvania Department of Transportation (PennDOT) to address issues concerning hot mix asphalt (HMA) permeability, specifically to determine the relationship between permeability of laboratory compacted specimens and corresponding field cores.

Three Superpave mixes were included in the laboratory study of permeability: one with nominal maximum aggregate size (NMAS) of 12.5 mm and two with NMAS of 9.5 mm. A falling head permeameter was used for determination of one dimensional coefficient of permeability (Figure 1).

Prior to conducting permeability tests, bulk specific gravity and porosity of both field cores and lab compacted specimens were measured. These two tests are vital in determination of air void and interconnected voids, as both are among the most important factors affecting permeability. We distinguish between air void and porosity through using the former to define all air void content of the compacted mix with respect to total volume of the compacted mix, and the latter to define only voids which can be permeated with water.

Laboratory compacted specimens were prepared to cover the range of air voids observed in the field cores. The field cores were mostly in the range of 35 to 40 mm of thickness, as they were from the wearing course for each project. Laboratory specimens were prepared at two different thicknesses: 60 mm and 100 mm.

Continued on page 5...
Results of Permeability Tests on Field Cores

It was found from the permeability tests on field cores that the 12.5 mm mix had significantly higher permeability compared to the two 9.5 mm mixes. The permeability of the 12.5 mm mix, however, did not exceed $6 \times 10^{-3}$ cm/sec (Figure 2). According to the criterion for 12.5 mm and 19.5 mm mixes, developed by Choubane et al. (1998), the mix is considered sufficiently impermeable if the mix permeability does not exceed $1 \times 10^{-3}$ cm/sec. Figure 2 shows that this criterion is almost satisfied for the 12.5 mm mix at porosity levels below 8 percent. At higher levels of porosity, the permeability well exceeds this threshold value. The $R^2$ for the relationship between porosity and permeability for the 12.5 mm mix is approximately 0.6. This $R^2$ does not provide a very strong correlation but it appears very encouraging considering other variables affecting the results.

For the 9.5 mm mixes (Figures 3 and 4), permeability is well below the limiting level of $1 \times 10^{-3}$ cm/sec, even when the porosity exceeds 8 percent. It should be cautioned that there will certainly exist a threshold porosity (or air void) beyond which a sharp increase in permeability will be observed even for fine mixes such as 9.5 mm. However, the magnitude of that threshold for the two mixes tested under this research is unknown. It appears that such threshold would exist at air void levels higher than the range of air voids in the field cores received. One of the 9.5 mm mixes (Figure 4) is by far the most impermeable mix of the group tested and in many cases, the cores delivered zero level of water permeability.

Figure 2. Relationship between porosity and permeability of field cores for mix 1 (12.5 mm)

Figure 3. Relationship between porosity and permeability of field cores for mix 2 (9.5 mm)

Figure 4. Relationship between porosity and permeability of field cores for mix 3 (9.5 mm)

Continued on page 6...
Results of Permeability Tests on SGC Specimens

Figure 5 indicates that, similar to the field cores, there is a reasonable relationship between porosity and permeability for the 12.5 mm mix, yielding an $R^2$ of approximately 0.72. Below 8 percent level, in general permeability does not exceed $1 \times 10^{-3}$ cm/sec. For several of the specimens, permeability was found to be very close to zero for porosities under 8 percent. The 9.5 mm mixes, as shown in the Figures 6 and 7, exhibit extremely low levels of permeability and for the case of one of the 9.5 mm mixes, zero permeability was observed.
Correlating Permeability of Field Cores to that of Lab Compacted Specimens

In order to find a correlation between permeability of lab prepared specimens ($K_{lab}$) and permeability of field cores ($K_{field}$), first specimens within a specific range of porosity were grouped together. A linear regression was applied to the group to correlate $K_{lab}$ and $K_{field}$. It was possible to apply a meaningful regression equation to the 12.5 mm mix (Figure 8) but not to the 9.5 mm mixes due to extremely low levels of permeability of these fine mixes. Care should be taken in implementing these results as they are based on limited data. PennDOT is in the process of obtaining additional mixes to be tested. Until such testing is complete, no definitive conclusions can be made.

Effect of Thickness on Permeability

Laboratory specimens were prepared at 2 thickness levels: 60 mm and 100 mm. The specimens were prepared at a range of air voids. Figures 9 and 10 present permeability of specimens for the range of air voids and thicknesses at which specimens were prepared for the 12.5 mm mix and one of the 9.5 mm mixes. The second 9.5 mm mix is not presented since most lab prepared specimens for this mix delivered zero permeability. From Figure 9, it can be seen that there is not a significant difference between permeability of 60 mm thick specimens and that of 100 mm thick specimens. However, from Figure 10 it can be seen that for the 9.5 mm mix, there is a significant effect of the thickness. At porosity levels over 8 percent, the 60 mm thick specimens deliver values almost 5 times larger than 100 mm thick specimens. Reduction in permeability with increasing thickness found in this study is consistent with the findings of Kanitpong et al. (2001) even though in their study, specimens were slightly thicker (approximately 65 mm and 115 mm) and the thinner specimens were found to deliver permeability values almost 10 times larger than thicker specimens.
This limited data of our research is an indication that the size of voids and the level of void connectivity in coarser mixes are sufficiently large to reduce the impact of thickness on water permeation. For this reason, almost similar levels of permeability are observed for both 60 mm and 100 mm specimens. However, for finer mixes, as the voids tend to be smaller in size and therefore resulting in higher chance of discontinuity of the void space, the thickness of the specimen becomes important and its effect cannot be ignored.

**Summary**

A study was conducted to investigate the relationship between laboratory measured water permeability of cores from asphalt pavements and that of laboratory compacted specimens. Field cores and loose hot mix asphalt samples were obtained from three constructed pavements. Two were 9.5 mm Superpave mixes and one was a 12.5 mm mix. The obvious conclusion from these measurements was that in general permeability increases as the air void or porosity increases. For 12.5 mm, porosity level of approximately 8 percent for both field cores and lab compacted specimens seems to be a threshold value beyond which permeability begins to increase drastically. For 9.5 mm mixes, the cores and lab compacted specimens could be considered impervious as they yielded permeability levels close to zero for the range of air voids in this research. It should be however noted that some of the 9.5 mm mixes provide significantly coarser gradations than the two mixes studied under this research. For such coarser mixes, there is a strong possibility that a behavior similar to that of the 12.5 mm mix be observed. In such a case, it becomes important to measure permeability of such mixes as not all 9.5 mm mixes could be considered impervious.

In general, it is found that for both 9.5 mm and 12.5 mm mixes, lab compacted specimens produce lower permeability compared with field cores at the same level of porosity. Through this research, a reasonable relationship was developed between lab compacted specimens and field cores for the 12.5 mm mix. However, care should be taken in implementing these results, as they are based on limited data. PennDOT is in the process of obtaining additional mixes to be tested. Until such testing is complete, no definitive conclusions can be made.

**References**


**Disclaimers:**

This work was sponsored by the Pennsylvania Department of Transportation. In the event that the Commonwealth does not agree with the content of the report or publication, the contractor must honor any request to omit credit to the Commonwealth or state the funding sources’ disagreement with the content or findings.

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**DON’T QUIT**

When things go wrong as they sometimes will;  
When the road you’re trudging seems all uphill;  
When the funds are low, and the debts are high;  
And you want to smile, but you have to sigh;  
When care is pressing you down a bit  
Success is failure turned inside out;  
The silver tint of the clouds of doubt;  
And you can never tell how close you are;  
It may be near when it seems afar.  
So, stick to the fight when you’re hardest hit -  
It’s when things go wrong that you must not quit.
World of Asphalt 2009 was a huge success; bringing more than 5,000 industry professionals with buying power together in one place.

Can you afford to miss this opportunity in 2010?
The Search to Improve Product Quality

For many years Quality Improvement and Industrial Engineering Practitioners have noted that various graphical descriptions of processes can be useful in improving product and service quality. These visual representations include: detailed flow-charts, work flow diagrams, value stream maps and fish bone charts. Each method is helpful depending on the process questions that need to be answered and theories being considered.

In this article you will gain a basic understanding of process mapping methods to visually represent and analyze how work happens. You will gain insight into how the Pennsylvania Asphalt Improvement Network (PASIN) Quality Improvement Organization uses process maps to assist the asphalt industry in making process improvements to better satisfy customer requirements.

History of Process Maps

Frank Gilbreth, an early pioneer, in the development of industrial engineering and process improvement, introduced the first structured concept in 1921. The target of his process charts where to find the “One Best Way” to improve processes. During World War II process mapping grew rapidly as it became a method to quickly train new workers in processing techniques. In the late 1950’s DuPont and Remington Rand developed a project management method using process mapping techniques, called the Critical Path Method, this type of process map added a critical timeline to the process map.

Process mapping got another boost when the ISO 9000 Quality Management System Standard required a business entity to follow a Process Approach when managing its business. To this end creating business process maps can assist the business entity to work towards ensuring its processes are effective (the right process is followed the first time to satisfy customers), and efficient (continually improved to ensure processes use the least amount of resources).

What is a Process Map?

A process map is a hierarchical method for displaying processes that illustrates how a product or transaction is processed. In simple terms it is a visual representation of the work-flow either within a process, or of the whole operation. Process Mapping comprises a stream of activities that transforms a well defined input, or set of inputs, into a pre-defined set of outputs. Commonly we look for an input point where something is injected to start a process, such as a material or specification and an output point where something is produced by the defined process such as a product or a component of a product is removed from the process. (See Example “A”)
A Good Process Map Should:
- Allow people unfamiliar with the process to understand the interaction of activities during the work-flow.
- Visually define where processes can be modified to proactively improve quality and efficiency.
- Assist in detecting causes and quickly making corrections to a process when product quality issues are discovered.

Macro vs. Micro Process Maps
Macro process maps are also called “high” level and are broad in scope whereas Micro process maps are very detailed in scope, can be many pages long, and can function like specific work instructions. Micro process maps tend to define very specific processes that are unique to an individual set of equipment or materials. It is not always easy to define the difference between a Macro and a Micro process map. The PASIN process maps are the Macro type, in that the maps define a high level set of process activities than can apply to all similar processes in the asphalt industry.

More Than Just How Work Gets Done
When we start developing a process map, we normally look at and define the “Current State” of a given process. This is how the process is currently operating today. Before you can improve the work area, we need a solid understanding of what works and what really needs improvement. Graphically defining the current state gives us a functional picture of the process and its full potential for improvement. Process maps can be much more than simple boxes and lines that document how work flows. They are a powerful set of tools that, when used properly, can unlock opportunities to:
- Improve Quality
- Increase Efficiency
- Eliminate Non-value-added Activities
- Reduce Cycle Time
- Expand Capabilities

- Simplify Process Work Flow
- Minimize Process Dependencies
- Gain Buy-in and Organizational Support for Change

PASIN Process Maps
The PASIN organization is using process mapping as a graphical representation of a high level work flow procedure that shows in a “flow” type style, actions between a defined starting and ending point in HMA processing. PASIN process maps incorporate two other quality improvement concepts:

1. **Best Practices**: techniques, methodologies, processes or procedures that through experience and research have proven to reliably lead to performance results recognized as exceeding those achieved by most organizations.

2. **Key Control Point**: a point of control in an operation which provides reliable information about the process variability (normally measurable) or finished product quality to meet requirements on a continuous basis.

Continued on page 12....
**Development of PASIN Process Maps**

Development of the PASIN Process maps for the asphalt industry dates back to March of 2006. PAPA resources Frank Colella and Ron Cominsky worked with process mapping consultants from R. Bowen International to develop “Draft” process maps of major processing steps in asphalt production. As a foundation the Draft documents were developed using the Army Corp of Engineers Asphalt Handbook and PennDOT documents and specifications.

During the paving season of 2006 Frank Colella and Mike Lohenitz visited many of the plants and field paving operations to verify and revise the process maps for accuracy of *Best Practices* and *Key Control Points*. Before final release of the process maps in December 2006, a work team of many of the Quality Control Managers from the asphalt industry reviewed, commented on, and made modifications and improvements to the process map.

(Example “B” below - partial section of a PASIN Process Map)

All of the PASIN approved process maps can be found on the PASIN Website at: [http://www.dot.state.pa.us/internet/districts/pasin.nsf](http://www.dot.state.pa.us/internet/districts/pasin.nsf) (Click on “Asphalt Pilot ISO 9001”)

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**2009-2011 PENNDOT LETTING SCHEDULES**

**Following is the tentative Letting Schedule for Construction Year 2009:**

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<th>January</th>
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**Following is the tentative Letting Schedule for Construction Year 2011:**

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Based on project types, projects will be advertised five (5) to seven (7) weeks prior to the letting date. All lettings will be held on Thursdays at 11:00 a.m., unless otherwise advertised.
RT Environmental Services, Inc.
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Fax: 610-265-0687
E-mail: gbrown@rtenv.com

Riverside Materials was one of the pioneering companies involved in maximizing recycling of reclaimed asphalt pavement, which is America’s most recycled material.

Now, Riverside has pioneered the use of high quality porous pavement using polymer oil in the hot mix asphalt product, which improves the properties of porous pavement.

Riverside Materials has already produced nearly 10,000 tons of their innovative product, which is used by the Philadelphia Housing Authority at locations throughout the city. The Philadelphia City Water Department has been designated by the Pennsylvania Department of Environmental Protection to oversee management of stormwater throughout the City, and the use of porous pavement at parking locations is a key part of the City of Philadelphia’s Stormwater Management Plan.

The photo below shows how well the Porous Pavement works. During a rainstorm, sheet flow can be seen on traditional pavement areas, but no sheet flow or wetted condition can be seen in parking areas. That is because at that location, infiltration of the rainwater is occurring through the porous pavement and there is no runoff occurring.

Based on experience, Riverside Materials’ technical staff recommends that engineers lay out parking areas with angled parking to maximize porous pavement longevity. Porous Pavement is generally used for automobile parking because as it is an open graded asphalt, it is not recommended for use in heavy traffic areas, including where vehicles turn. Riverside’s technical experience is that lengthened longevity will occur in Porous Pavement using an angled parking design where there is less vehicle turning, which makes basic common sense.

For those who wish to use a more advanced pavement mix, Riverside’s mix includes PG 76-22 Polymer Oil at 5.5%. When using this material in the Porous Pavement mix, typical Porous Pavement “film thickness” Specifications in Porous Pavement Guidelines are not used.

When placing the material, contractors should complete 50 Gytrations using a Superpave Gyratory compactor. Riverside Materials use a film thickness of 21.7 microns when using the polymer oil.

Porous pavement is also considered good for uses on walking trails, pathways and in other low traffic use areas.

Special points of interest:
- Riverside has pioneered the use of a high quality porous pavement using polymer oil in hot mix asphalt product.
- Riverside Materials’ technical staff recommends lay out of parking areas with angled parking to maximize porous pavement longevity.
- Porous pavement is also considered good for uses on walking trails, pathways and in other low traffic use areas.
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INTRODUCTION

The PennDOT sponsored project “Superpave In-Situ Stress/Strain Investigation (SISSI)”, conducted in two phases, was initiated in May 2001 and ended in November 2008. The project was conducted with the goal of determining whether constructed Superpave pavements would meet design expectations. Furthermore, with the emergence of improved mechanistic-empirical performance prediction models, actual pavement response and performance data were needed to calibrate and validate such models. As a result, several major objectives were pursued during the SISSI project: instrumentation of pavement sections, direct measurement of the response of Superpave asphalt pavement sections to vehicle loading and environment, direct evaluation of distresses developed in pavements using Superpave mixes, collection of the data for validation of mechanistic-empirical pavement design guide (MEPDG), and comparison of predicted performance to observed field measurements. In this article pavement condition assessment of SISSI projects and corresponding analysis with MEPDG is briefly presented.

INSTRUMENTATION AND DATA COLLECTION

At the heart of the SISSI project was instrumentation of several Superpave projects in 7 counties. Sites were selected at both the northern and southern parts of the Commonwealth to represent the temperature difference as well as the difference in the freeze-thaw cycles the pavement undergoes during the winter-spring period. Two types of pavements were considered: (1) full-depth structures including subbase, base, and Superpave-designed hot-mix asphalt layers constructed over subgrade; and (2) structural overlays including only Superpave-designed hot-mix asphalt layers. Figure 1 shows the counties where the Superpave pavements were instrumented for the SISSI project.

Continued on page 17...
Instrumentation of the pavement layers was an integral part of this project. Both load-associated and environmental transducers were installed at different layers. Two replicate locations were instrumented at each of the eight SISSI sites. A typical schematic showing the positioning of the transducers and the instrumentation cabinet is given in Figure 2.

Transducers installed to capture the pavement response under truck loading included pressure cells and strain gages in the unbound layers, H-type strain gages in asphalt layers, and multi-depth deflectometers (MDD) throughout all the pavement layers. The principal sources of in-situ environmental data at the test sites were thermocouples for temperature measurement, time-domain reflectometers for moisture content measurement, resistivity probes for frost depth measurements and pyranometers for solar flux.

Load-associated pavement response was captured through application of controlled loads at certain speeds using a specially mounted truck (Figure 3). Different speeds and load configurations were used for this purpose. The tractor-trailer was equipped with moveable concrete blocks so that the distribution of load on different axles could be controlled. Loading the pavement was conducted by both the front and rear load configurations at speeds of 5, 20, 40 and 60 mph.

Extensive laboratory testing was conducted on SISSI mixes. Here we focus on permanent deformation tests which were conducted using the Superpave shear tester. Figures 4 and 5 represent the average shear deformation for wearing and binder layers of the SISSI sites. Results of repeated shear testing at maximum pavement temperature indicates performance of SISSI mixtures in the range of good to excellent as no excessive permanent deformation was observed from these laboratory tests.
ASSESSMENT OF PAVEMENT CONDITION

All SISSI sites appeared to be in good shape except for two of the overlaid pavement sections. At these two sites, a significant amount of longitudinal cracks at the lane-lane and lane-shoulder joints are probably due to poor construction. Transverse cracks on the pavement surface may be induced by underlying concrete slabs or maybe thermally induced. Durability of Superpave mixes appeared to be of concern at two of the SISSI sites. One of these two sites was finally milled and overlaid during spring 2007. For the second site, only a small section of the road prior to the SISSI site was milled and overlaid. Our last pavement condition survey at this site, during November 2007, indicated no cracking of the pavement mat at the site even though minor to moderate raveling and loss of fine was evident at the vicinity of the longitudinal joint. The pavement had also experienced longitudinal cracking both at the joint between two lanes as well as at the joint between the travel lane and the shoulder. These cracks appear to be construction related rather than mix related. However, the minor to moderate raveling observed at this site is probably an indication of insufficient binder content at this site. Some Superpave mixes have generally demonstrated to be highly resistant to rutting and this excellent rut resistance has come at the cost of lower durability in some cases. In general, the field measured rutting, after 5 to 8 years of service, ranged between 2.5 to 8.5 millimeters indicating excellent rut resistance of SISSI mixtures at all the sites. Rut depths continued to increase through years, although the magnitude of increase was small at most sites.

IMPLEMENTATION OF SISSI DATA WITH MEPDG

The MEPDG provides a state-of-the-practice tool for design of new and rehabilitated pavement structures based on mechanistic-empirical principles. At the time of analysis for SISSI sites, the only comprehensive documentation for the MEPDG available to the general public was the Web-based version provided by the Transportation Research Board. Version 1.0 of the MEPDG software was also available for downloading from this site. One unique feature of the MEPDG is that pavement designers have a great deal of flexibility in obtaining the design input for a design project based on the critical nature of the project and the

![Figure 5. Shear deformation from RSCH Test for binder layers of SISSI sites at 52°C](image)
available resources through the Hierarchical Input Level (HIL). The HIL can be applied to various aspects: traffic, materials and environmental input. In general, there are three HILs. Levels 1, 2 and 3 result in the highest, intermediate and lowest levels of accuracy, respectively. For the SISSI sites, all input was obtained using a mix of three HILs. A 20-year design life was assumed for all SISSI sites. Initial IRI values were input as measured during the first profiling activity. A default reliability level of 90 percent was assumed for all performance criteria.

One general conclusion from Level 1 analysis was that no significant amount of fatigue or thermal cracking was predicted by the MEPDG models; this is consistent with field observations for most of the sites, except two of the overlaid sites where transverse cracking was dominant. One of these two sites was built on a cracked and seated old rigid pavement. It cannot be concluded with any certainty whether the observed cracks are caused by underlying concrete, fatigue behavior, thermally induced, or some combination of causes. For the second site, the pavement is built over old concrete. For this site, it cannot be concluded with certainty that the observed transverse cracking at this site is thermally induced. In regard to pavement permanent deformation, overall MEPDG under predicted rutting compared to field measurements. The magnitude of this under prediction varied significantly in the range of 5 to 90 percent depending on the site. Average under prediction was approximately 40 percent. An example of rutting prediction versus field measurements is presented in Figure 6 for one of the SISSI sites. The discrepancy observed between the predictions and field conditions is perhaps due to the national calibration coefficients in the empirical performance models. It is believed that with the availability of large amounts of field condition data, the MEPDG models could be more accurately calibrated for local conditions.

![Figure 6. Comparison between predicted and observed rut depth at one of SISSI sites.](image)

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CLEAN FILL AND NATURAL VIRGIN MATERIALS AGAIN AN ISSUE

Prior to 2004, the Pennsylvania Department of Environmental Protection’s Clean Fill limits were of concern, on how they might impact the use or reuse of the virgin materials in Pennsylvania. The Management of Fill Policy issued in April 2004 largely resolved that issue, as was intended that the Management of Fill Policy only applied to releases of contaminants. Apparently, Pennsylvania DEP is revising the municipal and residual waste regulations, and a recent change in regulatory revision wording has brought the issue of limits of constituents present in mined virgin materials back into the forefront.

Specifically, DEP is proposing revisions to Pennsylvania’s municipal and residual waste regulations to use numerical limits uniformly to define clean fill, and not use “Environmental Due Diligence” first, to determine whether or not a release has occurred. It has been learned that DEP is concerned about the I-99 construction water quality releases, and an incident where serpentinite formation rock material were imported from New York, which were later found to contain asbestos.

The PAPA Environmental Committee has learned that DEP has proposed language which would call into question materials not impacted by a spill or release, but where concentrations of constituents such as metals or asbestos exceed the most stringent (residential) statewide health standards. Materials produced from quarries in Pennsylvania can come from shale or serpentinite formations or other formations where natural concentrations of certain constituents exceed the residential statewide health standards. The concern is that materials quarried from these locations may be less marketable if the clean fill limits apply to all materials not just those impacted by a spill or release.

The PAPA Environmental Committee discussed the issue via a phone conference on June 15. A letter will be sent from PAPA to the PADEP immediately which will outline our concerns on this issue. PAPA will continue to be proactive in communicating with both PADEP and PennDOT on this issue.

PAPA has been in contact with PACA as well as other associations to urge vigilance in monitoring this situation. PACA plans to respond to this issue as well as there are other materials, such as peat moss in which natural concentrations of constituents do not present significant environmental harm. PAPA will keep you informed on this issue.

RECLAIMING SHINGLES INTO HOT-MIX ASPHALT RECEIVING ATTENTION

The use of shingles in hot-mix asphalt production is receiving national attention particularly in a recent article in C&D World. Most shingles contain a “blown” asphalt, a filler (talc or similar material) run into a fabric backed mat and then granules for cover and UV protection. Sand is sometimes placed on the back of the shingles to decrease “sticking”. RAS refers to recycling asphalt shingles.

Currently, a number of asphalt plants in Pennsylvania use new shingles as an ingredient in hot-mix asphalt. Recently the American Association of State Highway and Transportation officials completed an amendment process to update specification for the use of recycling asphalt shingles in hot-mix asphalt.

Two separate AASHTO Specifications documents on shingles are:

- MP 15—Standard Specifications for Use of Reclaimed Asphalt Shingles as an additive in Hot-Mix Asphalt.
...Continued from page 20

- PP 53 - Standard Practice for Design Considerations When Using Reclaimed Asphalt Shingles in New Hot Mix Asphalt

The amendments were proposed by a shingles recycling task force including materials engineers from the Missouri, Minnesota, and Tennessee Departments of Transportation. The amendments were discussed at the annual AASHTO meeting in early August 2008 in Asheville, N.C. The AASHTO Subcommittee on Material (SOM) discussed and edited the amendments on August 6, 2008, and approved sending the edited shingles specifications out for SOM balloting which took place later in 2008.

It was reported that the new AASHTO procedures for HMA mix designs when using RAS allow mixtures with greater than 70% virgin binder to be exempt from requirements to test for the need to adjust the performance grade (PG) of the virgin binder to accommodate the stiffer binder in the shingles. It was also stated that MoDOT and many other states are looking closer at the question of shingle binder availability in HMA.

Concerning mix design and binder consideration, the proposed AASHTO standard practice (PP 53) states that: “The introduction of RAS will affect virgin asphalt binder content requirements. The designer must determine the virgin asphalt binder content of the new HMA as part of the volumetric design procedure.” (Section 4.2)

Concerning the maximum amount of deleterious materials allowed in final RAS product after all grinding and screening steps, the AASHTO standard specification (MP 15) states that: “Reclaimed asphalt shingles shall not contain extraneous waste materials and is essentially nail-free. Extraneous materials such as metals, glass, rubber, soil, brick, tarps, paper, wood and plastic shall not exceed 3% by mass as determined on material retained on the 4.75 - mm (No. 4) sieve.” Lightweight material such as paper, wood and plastic shall not exceed 1.5% by mass as determined on material retained on the 4.75 - mm (No. 4) sieve.” (Section 8.1)

A limited amount of guidance is included in the proposed AASHTO specifications concerning the best means to manage the potential additional risk from asbestos in older, tear-off asphalt shingles when processed for recycling. The AASHTO Committees discussions in 2005 and in 2008 recognized that tear-off recycled asphalt shingles can be a valuable resource in HMA. When properly managed, recycling shingles poses minimum additional potential health or environmental risks.

The materials engineers recognized that local and state regulations vary across the country even though minimum regulatory framework for asbestos risk management is promulgated by various federal agencies. The proposed AASHTO standard specification (MP 15) states in the definitions section that: “Post-Consumer Asphalt Shingles - for the purpose of this specification shall mean asphalt shingles that are removed from the roofs of residential dwellings as defined by the U.S. Environmental Protection Agency’s National Emission Standards for Hazardous Air Pollution (NESHAP), 40 CFR 61 Subpart M when the new roofs are being installed. Post-consumer asphalt shingles are often called “tear-off” shingles. (Section 3.3)

“Post-consumer” asphalt shingles shall be processed prior to use to meet the requirements of...this specification and shall consist of asphalt roll roofing, cap sheets, and shingles, including underlayment, only. Roofing debris, including coal tar epoxy, rubber materials, or other undesirable components, shall not be used. Post-consumer asphalt shingles shall be certified to be in accordance with EPA’s NESHAP and any other local requirements concerning asbestos. (Section 5.2)

Continued on page 22...
“Reclaimed asphalt shall contain less than the maximum percentage of asbestos fibers based on testing procedures and frequencies established in conjunction with the specifying jurisdiction and State or Federal environmental regulatory agencies.” (Section 8.2)

To date, tear-off asphalt shingles have not been recycled in Pennsylvania to any significant degree.

For more information on this article, go to www.cdrecycling.org.

**POROUS PAVEMENT RECEIVING INCREASED ATTENTION**

The future use of porous pavement is receiving increased attention throughout the Commonwealth. Riverside Materials, a PAPA member located in Philadelphia has already placed nearly 10,000 tons of material for the Philadelphia Housing Authority as popularity in urban areas is increasing for using porous pavement as a Stormwater Best Management Practice. Riverside Materials uses an innovative mix for porous pavement production involving PG 76-22 polymer oil found to be a more superior product than other porous pavement mixes used to date. PAPA will be updating its Porous Pavement Guide to reflect this innovative material.

PAPA provided a speaker at the annual conference of Pennsylvania’s Department of Conservation and Natural Resources engineering staff for a well received seminar which included porous pavement held near York, PA in May. There is much interest in the new material, and the association received a letter thanking PAPA member Gary R. Brown, RT Environmental Services for presenting in-depth information on the use of porous pavement as a Stormwater Best Management Practice.

Also, a demonstration was held at the Western American Public Works Association Trade Show, held near Pittsburgh, in early June on porous pavement.

The Association is also working on several project profiles as nearly $200,000 was saved at a Bucks County site, where a previous site plan is being revised to incorporate porous pavement, as well as a rain garden, another Best Management Practice for Stormwater. Careful attention to selection of new best management practices means that site work costs can be reduced, as compared to BMPs which were incorporated into site plans prepared as little as two years ago.

The Association will keep all its members informed on the use of this product.
UPDATE TO PENNSYLVANIA ASPHALT PAVEMENT ASSOCIATION ENVIRONMENTAL GUIDE

The Pennsylvania Asphalt Pavement Association's Environmental Committee is pleased to announce update of its widely used Environmental Guide. The Environmental Guide contains in-depth information on complying with the Pennsylvania Environmental Laws and Regulations, including such items as Contingency Plans, Air Permitting, Stormwater Management, and the use of baghouse fines and scrubber pond residues.

The Environmental Guide has been updated to include a new Asphalt Fact Sheet, recently concurred with by the Pennsylvania Department of Environmental Protection.

The Environmental Guide is now available in compact disc format, and is bookmarked, and new revisions to the Guide, are summarized.

The Environmental Guide is available for Members for a cost of $12.95 (include normal mailing), or, $24.95 via overnight shipping. Non-members may purchase the Guide in CD format, for $100.

To order the Environmental Guide, simply fill out this form, and fax it RT Environmental Services:

Name: __________________________________________

Company: _______________________________________

Address: _______________________________________

City: __________________________ State: ________ Zip: __________

Phone: ___________ Fax: ___________ Email: ______________

Payment Information: By Charge (Check One)

☐ Visa
☐ Mastercard
☐ American Express

Card Number: __________________________ Expiration Date: _________

Card Holder Name: _______________________________

Fax this form to (610) 265-0687, allow normal delivery time of 5 to 7 days.
The resolution of technical issues is always paramount to our Association whether they are hot-mix asphalt (HMA) or environmental ones. Our Association is very fortunate to have two very active committees dedicated to providing industry’s input toward the resolution of key issues with the regulating agencies.

PAPA’s Technical Committee is comprised of 30 members and is chaired by Jeff Frantz (President, Lehigh Asphalt Paving and Barletta Materials). This committee meets three times a year to discuss current technical HMA issues facing our industry. During the last year this committee has discussed and addressed the following:

- Targeting the Job-Mix Formula (JMF)
- Bulletin 27 changes related to Voids-In-Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA)
- AASHTO T-283 Moisture Sensitivity Test
- Electronic Plant Statebook
- Density specifications for 25mm and 37.5mm SUPERPAVE mixes
- Longitudinal Joint Density
- RAP processing and stockpiling
- Warm-mix asphalt

PAPA’s Environmental Committee is comprised of 12 members and is chaired by Steve Bright (Vice President, EJB Paving and Materials Company). This committee also meets three times a year to discuss environmental issues that have a direct impact on our industry. This committee has addressed the following key issues:

- General Air Permit
- Spill Prevention Control and Countermeasure (SPCC) Plan Implementation
- Clean Fill and Surface Mines
- Asphalt Fumes / Plant Siting (Greenhouse gas emission issues)
- Waste Derived Liquid Fuel Ash Percentage

On behalf of the Association and the Board of Directors, I want to extend a sincere “Thank You” to all of the committee members for their time and dedicated efforts. It is through their service and contributions that our Association has been successful in providing the means for partnering with the Department of Transportation and the Department of Environmental Protection.
NEW MEMBERS

The following companies have joined the Association.

ENGINEERING & ARCHITECTURAL CONSULTANT MEMBERSHIP

NAVARRO & WRIGHT CONSULTING ENGINEERS, INC.

151 RENO AVENUE
NEW CUMBERLAND, PA  17070

Contact:  Mr. Paul J. Navarro, P.E., President
Telephone #:  (717) 441-2216
Fax #:  (717) 441-2218
E-mail:  pnavarro@navarrowright.com

ASSOCIATE MEMBERSHIP

ERGON ASPHALT & EMULSIONS, INC.

3847 POTTSVILLE PIKE
READING, PA  19605

Contact:  Stephan Romanchak, Area Manager
Telephone #:  (610) 921-0271
Fax #:  (610) 921-1477
E-Mail:  Stephan.Romanchak@ergon.com

The Pennsylvania Asphalt Pavement Association welcomes the new Engineering & Architectural Consultant Member and the new Associate Member to the Association. The membership contributes to making our industry a much stronger organization. We look forward to your participation in the Association. ♦
Understanding the basics of hot-mix asphalt – its composition and the importance of proper transporting, placement and compaction – is a vital necessity for anyone involved in the construction or inspection of asphalt pavements.

**Where:**
The Penn Stater Conference Center
215 Innovation Blvd.
State College, PA 16803

**When:**
November 4-5, 2009

**Fee:**
$350 (includes lunch both days)

For further info & online registration go to:
http://www.asphaltinstitute.org/seminars/HMA_101.asp

**Who Should Attend:**
This 2-day course taught by Al engineers and equipment industry representatives provides participants with a solid foundation in:

- Asphalt cements
- Aggregates
- Mix design and plant operations (as they relate to field applications)
- Proper hauling, placement and compaction procedures

This course has been developed for any-one seeking a basic understanding of hot-mix asphalt pavements. It is intended to focus on areas critical to the successful completion of an asphalt pavement. This course is also valuable for individuals who plan to apply for field technician certification in Pennsylvania.

Instructors, knowledgeable representatives from the equipment industry and Asphalt Institute engineers will lead this course. Attendees are encouraged to ask questions and interact with the instructors.
The luncheon was scheduled for Thursday, May 21, 2009 at the Ranch House Restaurant, Duncannon, Pennsylvania. The luncheon was for the former employees of the PennDOT Testing Lab which was located in Harrisburg. It was nice to get together for fellowship, discuss the good times and reminisce about the former PennDOT Lab.

The following are those who were in attendance:


Standing: (L-R) Roger Apple, Denny Leahy, Gaylord Cumberledge, Tom Campbell, Bob Klotz, Bill Amon, Dale Darkes and Jack Wierman.

The first article in our *Paving The Way* newsletter will give you a glance at what the new PennDOT Materials Testing Lab has to offer.

The Association is pleased to announce that this is the first newsletter done in-house. Melissa Posey has done an excellent job on the gathering of technical information, the format, color, scanning documents, etc. Making use of our new copier purchased in 2009, along with Microsoft Publisher and dedicated hard work, we hope you are pleased with this edition of *Paving The Way*.

We would appreciate your feedback. Please send your comments to PAPA @ pahotmix.org
## Price Index

Consolidated Procedure—Pennsylvania Department of Transportation / Department of General Services

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(Be sure to check PAPA’s website — www.pahotmix.org—for monthly Price Index)

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**Important Dates To...**

**REMEMBER!**

- **Executive Committee Meeting**
  - September 10, 2009
  - Omni Bedford Springs Resort and Spa

- **Board of Directors Meeting**
  - September 11, 2009
  - Omni Bedford Springs Resort and Spa

- **50th Annual Asphalt Paving Conference**
  - December 8-10, 2009
  - Hotel Hershey
  - Hershey, PA