

# OHIO ASPHALT

Issue 4, Volume 1

FALL 2004

## Technical Bulletin: Cold Weather Paving

**Mechanistic Design Software  
Demonstrated**

**Associate Member Spotlight –  
Highway Rubber Products**

**FPO Asphalt Scholarships  
Awarded**



From the novice to the pro, Flexible Pavements' new website offers something for everyone.



**YOU WOULDN'T DARE THINK OF PUTTING  
ALL YOUR VIRGIN AGGREGATE INTO ONE COLD FEED BIN.  
THEN WHY TREAT YOUR RAP THAT WAY?**



RAP fines can have up to twice as much AC content as 1/2x1/4 and more than four times as much as 3/4x1/2. So, feeding RAP out of one bin makes it virtually impossible to hold spec, especially with Superpave. Now, with a PEP Fold 'n Go mobile screening plant, you can consistently fractionate RAP at high tonnages the same as you do your virgin aggregate.

If you run more than one HMA plant, the Fold 'n Go is quickly and easily moved to handle RAP fractionating at each plant. This heavy-duty mobile screen plant is totally self-contained with three on-board stacking conveyors and sets up in just 15 minutes. RAP replaces expensive virgin ingredients pound for pound and without loss of mix quality. Start realizing serious material savings with your investment in a Fold 'n Go mobile screening plant and call Cantwell Machinery Co.

**Sales-Rental-Parts-Service-Financing**



Columbus	Perrysburg	Old Washington
614-276-5171	419-837-9425	740-489-5031
Cincinnati	Macedonia	Piketon
513-489-3040	330-467-4171	740-289-1818

Email: [info@cantwellmachinery.com](mailto:info@cantwellmachinery.com)  
Website: [www.cantwellmachinery.com](http://www.cantwellmachinery.com)

**CANTWELL**  
Machinery Company of Ohio

**VOLVO**  
Construction Equipment

# Southeastern

Equipment Co., Inc.

**Sale • Parts • Service • Rental • Leasing  
For All Your Construction Equipment Needs**

*Call or Visit the Southeastern Branch Nearest You*

**Cambridge-NorthCanton-Gallipolis-Dublin-Monroe-Perrysburg  
Mentor-Brunswick-Mansfield-Heath-Marietta-Brilliant**

## BOMAG

## 800-798-5438

[www.southeasternequipment.com](http://www.southeasternequipment.com)

# OHIO ASPHALT

Fall 2004

## 4 President & Executive Director's Column

## 7 Mechanistic Design Software Demonstrated

### SPECIAL INSERT: Technical Bulletin: Cold Weather Paving

## 13 Associate Member Spotlight – Highway Rubber Products

## 16 FPO Asphalt Scholarships Awarded

## 18 Seminar & Conference Season Approaching



Technical Bulletin

## ON THE COVER

### ANTICIPATING SOME COLD WEATHER PAVING?

Placing asphalt concrete in cold weather involves challenges that can result in poor performance of the pavement. Before you put your project at risk, you'd better read the "Technical Bulletin: Cold Weather Paving" included in this issue of *Ohio Asphalt*. Because it seems like this question comes up every fall, save the technical bulletin for future reference.



Flexible Pavements of Ohio is an association for the development, improvement and advancement of quality asphalt pavement construction.  
[info@flexiblepavements.org](mailto:info@flexiblepavements.org)

*Ohio Asphalt* is published by Flexible Pavements of Ohio four times a year. Advertising deadline is the 1st of the month preceding publication. *Ohio Asphalt* is not copyrighted and portions may be reprinted with the permission of Flexible Pavements of Ohio. P.O. Box 16186, Columbus, OH 43216; telephone: 614.221.5402, 888.446.8649 (Ohio only); fax: 614.221.0394; website: [www.flexiblepavements.org](http://www.flexiblepavements.org)

## Officers

### Chairman

Howard J. Wenger  
*Northstar Asphalt Co.*

### Co-Chairman

Gerald N. Little  
*Shelly & Sands, Inc.*

### Treasurer

James S. Tharp  
*The Shelly Co.*

### Board of Directors

Peter M. Alex  
*The Shelly Co., Twinsburg Div.*

Wayne Brassell  
*Kokosing Construction Co., Inc.*

Brent Gerken  
*Gerken Paving, Inc.*

James P. Jurgensen  
*Valley Asphalt Corp.*

Paul Scala  
*Kenmore Construction Co.*

Michael D. Thompson  
*Barrett Paving Materials, Inc.*

Donald C. Weber  
*The Shelly Co., Findlay Div.*

### Staff

Fred F. Frecker  
*P.E., President & Executive Director*

Clifford Ursich  
*P.E., Executive Vice President*

Jerry Wray  
*P.E., Vice President of Government Relations*

Florence H. Flowers  
*Administrative Assistant*

William H. Fair  
*P.E., Customer Service Engineer*

**Creative Director** Janine Robinson  
**Advertising Sales** Jackie Kiefer

**Layout** Nikkole Kozlowski  
**Ad Sales & Editorial Preparation** TRIAD, Inc.  
6525 Busch Blvd., Suite 207  
Columbus, OH 43229

**Editorial Staff** Jerry Marks  
614.846.8761 or 1.800.288.7423  
fax: 614.846.8763

Colleen Stoker  
editorial e-mail: [editorial@triad-inc.com](mailto:editorial@triad-inc.com)  
advertising e-mail: [sales@triad-inc.com](mailto:sales@triad-inc.com)





**Fred F. Frecker P.E.,**  
President & Executive  
Director

# Introducing Our New and Improved Website

It may seem like 1998 was not very long ago, but that's a lifetime in cyber years. Now, six years after Flexible Pavements of Ohio first posted its website on the Internet, the association is excited to re-introduce a new and improved [www.flexiblepavements.org](http://www.flexiblepavements.org). A lot has changed since we first developed our website, both in terms of technology and the landscape of our industry. We felt this was the right time to make an already great resource even more useful. Regular visitors will find all the popular features from the old site, with some exciting new ones as well.

In 1998, the Internet was still relatively new to many professionals. Many Internet users were just beginning to take advantage of the World Wide Web as a research tool. Consider the fact that Internet usage has grown from practically nothing a decade ago to hundreds of millions of users worldwide. Built with customers and members in mind, the original Flexible Pavements website was information-rich with simple graphics to allow fast download for users with slower Internet connections or older computers.

The website's re-design was partly driven by the reality that the technical capabilities and user expectations of web surfers have changed substantially since 1998. Out-of-date websites are easy to spot – and even easier to avoid. The other factor is that we have an additional and different group of users of the website.

In the past, the association found its communications efforts were best spent focused on technical support for

## Internet Facts:

- **From 1992 to 2002, the number of users on the Internet grew from practically nothing to more than 600 million worldwide**
- **63 percent of all Americans have gone on-line**
- **This year, more than half of U.S. on-line households have access to a broadband connection, outpacing dial-up services for the first time**



customers who buy and use asphalt. This approach, which was reflected throughout the association's original website, made sense when customers and contractors were the only ones who showed interest in the finer details of road construction. Demand for new kinds of information, from audiences who previously showed little interest in the subject, has made for a new communications challenge for the association.

One reason for interest from new audiences – namely policy makers, the media and the motoring public – has been the high-profile competition between the asphalt and concrete industries. When the concrete industry began to challenge the state's pavement-selection process, legislators, reporters and concerned taxpayers began to turn to Flexible Pavements and its website as an information resource for help in untangling the facts.

These groups bring with them limited experience in engineering science and pavement performance, and therefore require a different communications approach. The new website has language for the novice as well as the pro, organized to make finding it quick and easy.

This is not to say that Flexible Pavements has abandoned its focus on customer-oriented communications. To the contrary, visitors interested in detailed technical support will find the site more useful than ever. A site-wide search function will allow visitors to access information available in a huge number of technical documents and magazine articles. Need to know more about rubblization? Enter it as a search term to find one of several technical documents or articles written in varying levels of detail.

Whether you're a reporter searching for an explanation of

Perpetual Pavement in terms readers can understand, or an engineer trying to learn the finer points of polymer modified binders, navigating the wide array of information available on the website will prove simpler and more fruitful than ever.

We expect the new and improved website will be a more valuable tool for this new group of users, as well as the traditional group seeking technical information on the design,

construction and maintenance of asphalt pavements. We believe the website reflects the leap the association has made in technology and communication over the past six years and will become a regular stop for all those interested in the asphalt pavement industry. Visit [www.flexiblepavements.org](http://www.flexiblepavements.org) today and be sure you mark it as a "favorite" on your web browser.



## A Few Exciting New Features On [www.flexiblepavements.org](http://www.flexiblepavements.org):

- A site-wide search function makes searching for information available in a huge number of technical documents and magazine articles quick and easy.
- Register on-line for a conference or seminar.
- Click on the "Government" page to follow the latest news in state and national government that affects the road construction industry. As lawmakers make decisions that have a huge impact on our industry, you can keep abreast of the latest developments and learn how to get involved.
- The electronic "Press Room" makes the latest news from Flexible Pavements of Ohio and the asphalt industry available at the click of a mouse. Journalists and others interested in following trends and news about the asphalt industry will find the educational resources in the press room invaluable.
- Join an electronic mailing list for regular industry updates. News about asphalt paving and road construction issues will come to your e-mail inbox on a regular basis. (We promise not to send you any junk – and you can quit any time.)



*FROM ROCKS TO ROADS, WE'VE GOT YOU COVERED!*

- ASPHALT PRODUCTION
- CONCRETE PRODUCTION
- LIMESTONE MINING & PRODUCTION
- SAND & GRAVEL MINING & PRODUCTION
- CONTRACT PAVING
- LIQUID ASPHALT STORAGE FACILITY
- QUALITY CONTROL FACILITY
- TURN KEY CAPABILITY ON ROAD CONSTRUCTION

THE SHELLY COMPANY \* 80 PARK DRIVE-P.O. BOX 266 \* THORNVILLE, OHIO 43076  
PHONE 740.246.6315 FAX 740.246.4715

A DIVISION OF OLDCASTLE MATERIALS GROUP-AN EQUAL OPPORTUNITY EMPLOYER

# Mechanistic Design Software Demonstrated

On Sept. 14, The Asphalt Pavement Alliance demonstrated PerRoad 2.4, which is newly developed, mechanistic-empirical-based, pavement-design software, to representatives from Indiana, Kentucky, Michigan and Ohio.

Presenting the workshop were Dr. David Timm of NCAT, and Dr. David Newcomb of NAPA. Attending the workshop were representatives from four states, including the Indiana, Kentucky and Ohio DOT's, FHWA, Ohio University, BBC&M Consultants and the state asphalt pavement associations from Indiana, Kentucky, Michigan and Ohio.

The attendees were enthusiastic about the potential of PerRoad 2.4 as a pavement design and analysis tool that will particularly enable the design of perpetual pavements. Dr. Shad Sargand of Ohio University offered the attendees input data necessary to calibrate the design to Ohio materials.

PerRoad 2.4 software is a free download from the Asphalt Pavement Alliance website [www.asphaltalliance.com](http://www.asphaltalliance.com)

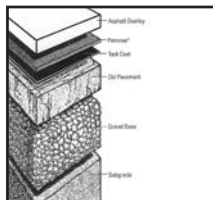


Dr. David Timm (left) and Dr. David Newcomb presented the PerRoad Demonstration Workshop in Cincinnati.

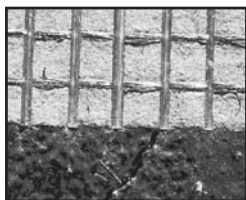
OHIO  
ASPHALT

## Geosynthetics! with an Attitude!

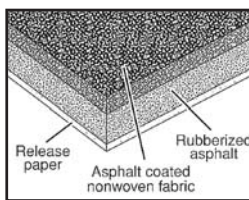
**Value Engineered Site Solutions!**



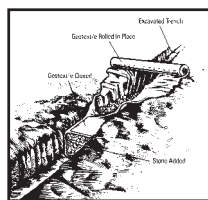
**Paving Fabric**



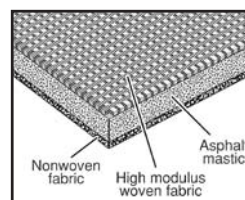
**GeoGrids**



**GeoComposite**  
water proofing for  
roads & bridges



**Geotextiles**  
nonwoven & woven  
for every application



**GeoComposite**  
water proofing for  
roads & bridges

**Valley Asphalt**  
CORPORATION

937-293-4119 or Fax 937-293-4110  
Warehouse: 11641 Mosteller Rd.  
Cincinnati, OH 45241  
Warehouse: 1901 Dryden Rd.  
Dayton, OH 45439

**GILSONITE®**  
asphalt modifier gives higher  
stability to hot mix asphalt  
**Erosion Control Products**

**Subdistributor**  
**STATE HIGHWAY SUPPLY INC.**  
Dublin, OH - 614-799-9811



## TRAFFIC CONTROL AND SAFETY MATERIALS

OVER 50 LOCATIONS SERVING 20 STATES  
PROVIDING ROUND-THE-CLOCK SERVICE



Signs & Sign Stands  
Solar Sign Stand  
Safety Equipment  
Plastic Fencing  
Barricades  
Fitch Inertial Barriers  
Plastic Drums & Cones  
Solar Message Centers  
Solar Advance Warners  
Truck-Mounted Attenuators  
Warning Lights & Batteries  
Temporary Pavement Markings  
Glare Screen  
Delineators  
Reflectors  
Work Area Lighting



Sales, Rental, and Lease Purchase of  
Work Zone Traffic Control Equipment and Services  
Installation Specialists

### PROTECTION SERVICES INC.

John Gannon • Steve Fisher • Chuck Blevins  
Cleveland Columbus Cincinnati

"Toll Free" 1-866-489-1234

Protection Services Inc., a Division of Stabler Companies Inc.  
(717) 236-9307 • 635 Lucknow Road, Harrisburg, PA 17110  
www.protectionservices.com

# OHIO ASPHALT

## To Advertise in Ohio Asphalt

Call Jackie Kiefer at  
614-846-8761 or 1-800-288-7423

[jkiefer@triad-inc.com](mailto:jkiefer@triad-inc.com)

## Quality Pavements now Cost Less and Last Longer..

Because ODOT developed specifications for polymer modified asphalt with the Contractor in mind.

Next time you want quality and cost savings just specify  
PG70-22M asphalt cement.

"It was so easy. When I specified polymer modified asphalt all I had to do was to change the asphalt cement from PG64-22 to PG70-22M using ODOT 908 specifications. Contractors knew what to do. Now I have longer lasting pavements which require less maintenance."



Thin Overlays  
City Streets  
County Routes  
Interstate Paving  
Airports

Rubber Compounds  
For Better Paving  
Since 1951

**rub•r•road™**

Highway Rubber Products 330-499-2900 Email: [pwelsh1000@aol.com](mailto:pwelsh1000@aol.com)



**Asphalt Materials, Inc.**

**Producing quality Asphalt Products including  
Asphalt Cements, Modified Asphalt Cements  
& Asphalt Emulsions**

### Oregon, Ohio

(419) 693-0626

- SHRP, PG Graded Asphalt Cement
- Polymerized Asphalt Cement
- Multigrade Asphalt Cement
- Asphalt Emulsions

### Marietta, Ohio

(740) 374-5100

- Asphalt Cement
- Cutback Asphalt Cement
- Asphalt Emulsions

### Marion, Ohio

(740) 387-0776

- Asphalt Emulsions
- Slurry & Micro Surfacing Emulsions

**"We are your Source for Specialty Asphalt Products"**



# ***FLEXIBLE PAVEMENTS OF OHIO***

***An Association for the development, improvement and advancement  
of quality Asphalt Pavement Construction.***

37 West Broad Street, Suite 460, P.O. Box 16186, Columbus, Ohio 43216

888-4HOTMIX (In Ohio), 614-221-5402, 614-221-0394 (Fax)

[flexpave@ameritech.net](mailto:flexpave@ameritech.net)

[www.flexiblepavements.org](http://www.flexiblepavements.org)

## **Technical Bulletin: Cold Weather Paving - 1 October 2004**

### **Introduction**

The issue of continuing to place Hot Mix Asphalt (HMA) in cold weather comes up every autumn. Projects get delayed. The weather turns cold and damp. Specifications generally set weather and temperature limits beyond which paving is to be stopped; but, jobs often need to be completed in spite of the specification limits. Everyone starts to wonder whether they should continue to pave. The question is "Will HMA pavement placed in cold weather perform adequately?"

A recent industry survey conducted and analyzed by a group of researchers at Auburn University (1) revealed the prevalence of this situation. The responses showed that in the north-central region of the country up to 5 percent of all projects get placed outside the normal paving season of April to November, and an even higher percentage are placed in adverse weather conditions overall.

The challenge of cold weather HMA paving is to achieve adequate compaction. There is general consensus that, if adequate density is obtained, the pavement will perform as expected. Thin courses and surface courses are at the greatest risk of low density and poor performance when placed in cold weather. Intermediate and base courses greater than 2-inches thick generally can be adequately constructed with little change in normal procedures.

### **Time for Compaction**

Cold weather compaction depends upon having enough time and enough rollers to obtain adequate density while the temperature of the HMA mix being placed is still within the compaction temperature range, approximately 275 to 175 degrees F.

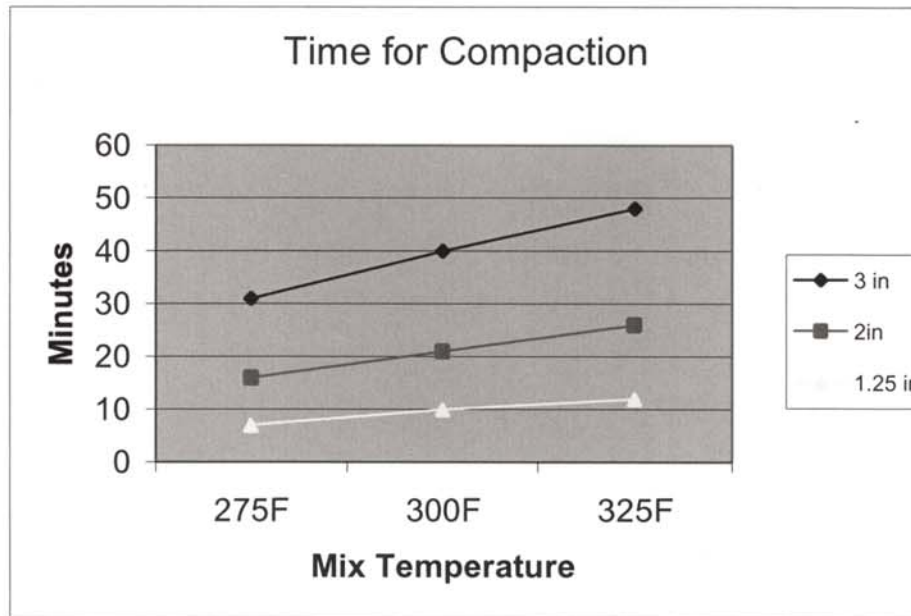
What factors affect the time it takes for the HMA to cool below 175 degrees F? All weather factors affect this time: air temperature, wind speed and the presence or absence of sunlight. The type and temperature of the surface on which the HMA is to be placed is a factor too. But, the two most important factors are the temperature of the mix and the thickness of the course being placed. It is generally accepted that if conditions do not permit 10 minutes of time for compaction, adequate density can probably not be achieved.

It is easy to determine this time for any set of conditions. Dickson and Corlew published cooling curves in 1970 from which you can read the time available for compaction for any given set of ambient and mix conditions. Examples of these charts are shown in the *Hot Mix Asphalt Paving Handbook* (2). This task became even easier with the development of the *PaveCool* software by the Minnesota DOT (download *PaveCool* at [www.mrr.dot.state.mn.us/research/mnroad\\_project/restools/cooltool.asp](http://www.mrr.dot.state.mn.us/research/mnroad_project/restools/cooltool.asp)). With the *PaveCool* software, one can quickly determine the time available for compaction for any set of conditions and quickly compare the effects of changes in course thickness and mix temperature.

For the conditions specified, the following chart shows the time available for compaction for various combinations of course thickness and mix temperature at placement.

Conditions:

- 30 degrees air and base temperature
- 5 mph wind
- clear and dry
- mid afternoon
- mid-December
- Columbus, OH
- binder grade, PG 64-22
- a single course being placed on an existing asphalt concrete surface,



**Example:** At a mix temperature of 275 degrees F and course thickness 1.25 inches, the time available for compaction is 7 minutes, too short to realistically achieve density. If the mix temperature is raised to 325 degrees F and all other factors are the same, the time available for compaction is 12 minutes. Now you have a chance of getting it compacted before it cools. If the mix temperature is held at 275 degrees F, but the course thickness is increased to 2 inches, the time available for compaction is 17 minutes. It can be readily demonstrated using PaveCool that for any cold weather temperature there is a combination of mix temperature and course thickness that will provide adequate time for compaction.

Contractors responding to the aforementioned survey (1) indicated that achieving proper density in cold weather could be difficult, but was not impossible. The other challenge to adequate cold weather construction is economics. Cold weather construction will cost more. Can the extra costs be recovered?

In the following sections we will discuss the changes in procedures needed to obtain durable construction during cold weather and identify extra costs associated with these changes.

## Plant Production

Mix temperature is one of the most influential factors on time available for compaction. So, an obvious solution is to produce hotter mix. How much, though, can the mix temperature be raised without causing damage and what is the cost?

Binder suppliers normally recommend a mixing temperature based on viscosity tests. The NAPA publication on Cold Weather Compaction (3) suggests it is probably safe to mix at a temperature 18 degrees F above the recommended temperature. However, above that, one risks excessively aging the binder or placing too thin a coating on the aggregates. Raising the mix temperature takes extra fuel and lowers the production capacity of the plant. An examination of the plant production tables in the *Hot-Mix Asphalt Paving Handbook* (2) indicates that raising the mixing temperature 25 degrees F can reduce the production capacity of the plant by 15 percent or more. Likewise, increased aggregate moisture contents reduce the production capacity even more dramatically. Given the combination of need for a higher mix discharge temperature and the presence of colder aggregates with higher moisture contents, it is easy to see that the plant production rate may be cut in half to produce mix in cold weather. Stated otherwise, twice as much fuel may be required to produce mix in cold weather.

## Hauling and Temperature Segregation

The next challenge is to get the mix into the paver with as much of that heat left as possible. The first thought is to tightly tarp the truck beds, however, research (4) has shown that tarping of loads has little effect on the average temperature of the load for normal haul times. So, why bother? This raises the topic of temperature segregation.



Temperature segregation is the presence of masses of mix in the mat with temperature differentials that prevent uniform compaction. When a load is transported in cold weather without a tarp, the cold crust that forms on the load may be placed through the paver as a cold spot in the mat that cannot be adequately compacted. There is little consensus as to how important this phenomenon is. Some believe this may be an important issue in the performance of pavements, and as a result there has been a recent proliferation in equipment for re-mixing material as it is fed to the paver. Others point out that we didn't know about this effect until the advent of the thermal imaging camera. If wasn't a problem before, is it now?

Until this issue is resolved, the recommendation is to tightly tarp the loads, at least for longer hauls, and to prevent exposure to precipitation. If tarps are used they should tightly cover the load and seal over the sides of the truck bed. Loose, flapping tarps may actually increase heat loss. Tarping loads for short hauls will not save much heat and may take precious time. Tarping loads for longer hauls will not significantly raise the temperature at which the mix is delivered to the paver, but may result in a more uniform temperature mix, thereby minimizing the effect of temperature segregation.

All of the foregoing speaks to the basic objective in cold weather paving – keep the total time from mixing to compaction as short as possible. Haul trucks should not be kept waiting to unload into the paver. Minimize the handling and exposure of the HMA. Windrow paving and transfer devices that extend the time and further expose the HMA to the environment should probably be avoided. Move the material directly from the haul truck as a mass into the hopper of the paver.

## Placement

If the HMA course is to be placed on an aggregate base, the base must be solidly compacted at or below optimum moisture and not frozen. Frozen or excess moisture saps the heat out of HMA rapidly and may contribute to soft spots in the base. If being placed over an existing paved surface, the surface must be dry and the tack coat material set. How do you get that slow-setting emulsion tack coat to break and dry in cold, damp weather? You could use rapid-curing liquid asphalt for tack, if you can get it. Instances have been reported where contractors have used jet racetrack dryers or infrared heaters to dry the surface before placement of the HMA.

Areas that require handwork or feathering of the mix can probably not be placed rapidly enough to permit adequate compaction. Construction of this type of work must be avoided during cold weather or considered to be temporary. Construction of transverse joints must be placed with good technique, starting off with the screed at the joint and on starting blocks, so that time is minimized and the need for handwork is eliminated. Paver speed should be regulated to allow the available rollers to complete compaction within the time and temperature constraints. Other operations should follow the best techniques as would be practiced under any conditions.

## Compaction

The goal is to compact the HMA while the mix is still within the compaction temperature range, 275 to 175 degrees F. The number, type and capacity of the rollers should be selected to accomplish adequate compaction within the time available, based on environmental conditions. More rollers and higher-capacity rollers operating right behind the paver will be necessary to accomplish the compaction in the short time available. The use of rubber tired rollers may be the answer in obtaining density quickly. However, special care must be used to heat the tires to prevent mix pick-up. Use the skirts around the tires. Contractors have fitted heaters within the skirt enclosures to pre-heat the tires and ducted the engine exhaust inside the skirt enclosures to keep the tires hot. Silicone-based additives are on the market for mixing into the water used to prevent mix pick-up on the tires. The provision of additional rollers and their operators, heating of tires and special release additives all represent additional costs of cold weather paving that must be accounted for.

## Specifications and Quality Assurance

Is it worth the extra cost and effort to place HMA in cold weather? Ultimately, only the person paying the bill can answer that question. If a decision is made to place the HMA in spite of the cold temperatures, it usually costs a lot less to do the job right the first time than it does to do it over. Research out of Washington State has indicated that even a few percentage points less density results in double-digit percentage losses in durability (life of the pavement). So, if you're the owner, it probably makes sense to invest the extra cost to get adequate density, if you absolutely have to have the work completed in cold weather.

How do you handle the extra cost and payment for this extra effort? The usual way is by change order, but scarce, suitable working days can be lost while such things are negotiated and processed. If an owner anticipates that such a situation might occur on his project, it may be worthwhile to set up an alternate bid item for the extra cost of cold weather paving in order to establish in advance a price for the extra work needed to adequately place and compact HMA in cold weather. Issues such as changes to course thickness and mix type would have to be addressed and some quality assurance or acceptance measures might have to be altered. If the project were to be a density acceptance project (ODOT, Item 446) then the effectiveness of the contractor's compaction procedures would be revealed by the acceptance cores. If, however, the method of acceptance is another basis, such as ODOT 448, then some other measure for verifying the effectiveness of the contractor's placement and compaction procedures would have to be established in the specifications. The owner may require the placing of a control or test strip, to ensure minimum acceptable density results from the contractor's proposed procedures. For information on constructing a control strip, see reference 5.

## Summary and Conclusions:

Hot Mix Asphalt paving can be successfully accomplished in cold weather without compromising the performance of the pavement, but

costs will be higher. The goal is to obtain adequate time to finish compacting the mix, while it is still in the compaction temperature range (275 to 175 degrees F). Time available for compaction is most dependent upon the temperature of the mix and the thickness of the layer being placed, and less dependent upon the environmental conditions. Making adequate time available for compaction can be accomplished by taking steps to alter these dependent variables and to minimize the time of exposure of the mix between mixing and compaction. Specific actions may include any or all of the following as necessary:

- Increase the mix temperature
- Increase the layer thickness
- Minimize the time/length of haul
- Work the rollers as close to the paver as possible
- Use more and/or higher-capacity rollers

Handwork and feathering can probably not be adequately performed in cold weather and, so, these operations should be avoided; or, if necessary, the results should be considered as temporary surfaces to be replaced in suitable conditions.

Of course, placing a thin HMA course in cold weather should be avoided, if possible. Placing a relatively thick intermediate course that can be used as the temporary wearing surface until proper conditions return for placing a thin surface course will involve little change to construction procedures and little additional risk of poor performance.



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

## References:

- (1) Hot Mix Asphalt Pavement Construction in Adverse Conditions - An Industry Survey. Dr. David H. Timm, Dr. Mary Stroup-Gardiner and William E. Barrett, Department of Civil Engineering, Auburn University
- (2) Hot-Mix Asphalt Paving Handbook, Transportation Research Board, et al, LC 00-135314, James A. Scherocman, Consultant. 2000.
- (3) Cold Weather Compaction, NAPA, QIP 118, 1998
- (4) Are Hot-Mix Tarps Effective?, NAPA, IS-77, C.E. Minor, 1981
- (5) Construction of Hot Mix Asphalt Pavements, MS # 22, Asphalt Institute, 2<sup>nd</sup> Edition



# Highway Rubber Products Corp. Dedicated to Improving Durability of Asphalt Pavements

The Highway Rubber Products Corporation is a distributor of styrene-butadiene rubber (SBR) additives for the polymer modification of asphalt binders for use in road paving and maintenance applications. But, more than that, the dedicated staff of Highway Rubber Products works to improve the quality of asphalt pavements with evangelical zeal.

The company traces its roots to the Flex-A-Seal Corp. that began in 1960 as a manufacturer's representative for the Firestone Tire and Rubber Company's Rub-R-Road Division. In 1975, Rub-R-Road, Inc. was spun off from Firestone and Highway Rubber Products Corp. was formed to partner with Rub-R-Road in its efforts in Ohio, Pennsylvania and West Virginia. Harold Carlson of Rub-R-Road can be credited for the development of SBR polymer modification of asphalt from its beginnings in the 1950s. Highway Rubber Products' Principal and President Patrick Welsh has been instrumental in educating the highway industry of the merits of SBR asphalt modification and its subsequent widespread use. The Highway Rubber Products Corporation does business from its offices in North Canton.



Overlay containing Rub-R Road SBR being constructed in the early 1950s.

Beginning in 1951, Firestone sponsored research at the University of Kentucky to develop the application for roads and highways. Out of this research grew a much greater understanding of how rubber could be used in asphalt to improve the performance and durability of asphalt pavements. Since 1975, the Highway Rubber



Shown in this 1962 photo, Harold Carlson (left) is credited for the development of SBR polymer modification of asphalt.

Products Corp. has been supplying the asphalt paving industry with the rubber paving materials and the technical expertise to use them properly. Technical service is the primary sales effort of the company. According to Welsh, Highway Rubber Products Corp. believes it has two customers on every project, the contractor who buys the material and the owner agency who specifies it. The company field staff always has and continues to work with both the contractors' and owners' personnel to help obtain the best result for both customers.

There have been some bumps along the road. As Welsh likes to say, "Good word travels one mile per hour in the

highway community, while bad word travels a hundred miles an hour." Some early failures with a competitor's product setback the market development and convinced Highway Rubber Products that diligent technical field service was essential to ensure proper application of the product. Skill and special workmanship is necessary to overcome the production and placement challenges inherent in using polymer modified asphalt. The Highway Rubber Products staff provides that expertise to its customers.

The Highway Rubber Products Corp. can cite a long and proud history of accomplishment in delivering superior performing pavements. Early projects with ODOT Districts 4 and 12 in northeast Ohio "paved" the way for polymer-modified asphalt pavements in Ohio. Since that beginning,



Shelburne Road in Shaker Heights, Ohio, was surfaced with SBR modified asphalt in 1973 and served for more than 28 years.



many successful projects have been performed under a variety of ODOT special provisions, proposal and plan notes and supplemental specifications. In 1996, polymer modified asphalt was adopted as standard for ODOT's heavy-traffic pavements, but contractors were choosing polymer modified asphalt for their warranty projects even before it was required by ODOT specifications. The experience has clearly shown that polymer modified asphalt is a cost effective way to extend the life of asphalt pavement surfaces. It is no coincidence that, since Flexible Pavements of Ohio began recognizing long-lived pavements with the Master Craftsman award in 1999, four of Highway Rubber Products' projects have received the award. Welsh says that with this track record the decision to use polymer modified asphalt in the surface is a "no-brainer. It's the most affordable insurance you can buy for good performance."



*For more  
information on  
Highway Rubber  
Products Corp's  
products and services,  
call 330-499-2900  
or visit  
[www.rub-r-road.com](http://www.rub-r-road.com)  
email:  
[pwelsh1000@aol.com](mailto:pwelsh1000@aol.com)*



Pat Welsh accepts the Master Craftsman Award.



1967- Paving a Cleveland street with an SBR modified overlay.

# FPO Asphalt Scholarships Awarded

Flexible Pavements of Ohio and member companies delivered more than \$20,000 in checks to college students this fall through the association's Ohio Asphalt Scholarship Fund.

Since 1996, more than 150 Ohio college students have been assisted through the program, which sponsors a series of scholarships at the nine in-state institutions offering courses in asphalt pavement technology. The Ohio Asphalt Scholarships are awarded to qualifying students attending:

- **University of Akron**
- **Bowling Green State University**
- **University of Cincinnati**
- **University of Dayton**
- **Ohio University**
- **Ohio Northern University**
- **The Ohio State University**
- **University of Toledo**
- **Youngstown State University**

Administered through the National Research and Education Foundation of the National Asphalt Pavement Association, the Ohio Asphalt Scholarship Fund's objectives are to:

- Provide an incentive for students to gain knowledge in asphalt pavement technology by requiring each student receiving a scholarship to take at least one related course in hot mix asphalt
- Provide an incentive for colleges/universities to offer education in hot mix asphalt technology by creating a student demand for the course
- Establish close ties between the asphalt industry and universities, to raise awareness of asphalt pavement technology and foster asphalt pavement-related research
- Provide a workforce trained in asphalt pavement technology

More than ever this year's support by FPO members was crucial, as the program's endowment-based scholarships were in jeopardy because of past awards and a decline in the stock market. Rather than forgo the 2004-05 program, many of the original contributing FPO companies made additional contributions to award \$1,200 scholarships to 17 students.

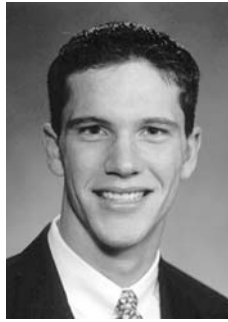
Scholarship winners were announced at the FPO Annual Meeting and checks were distributed this fall for the current academic year.



## The member companies sponsoring the 2004-05 Ohio Asphalt Scholarships and recipients are:



John R. Jurgensen Co./  
Valley Asphalt Corp.  
Ohio University  
Blake Andrews



Barrett Paving  
Materials, Inc.  
University of  
Cincinnati  
Jeffery Barrow



S.E. Johnson  
Companies, Inc.  
Ohio Northern  
University  
Danielle Brinkman



Kenmore  
Construction Co.  
Ohio University  
Robert Heady



The Shelly Company  
Bowling Green State  
University  
Justin Hines



Barrett Paving  
Materials, Inc.  
Ohio University  
Thomas Holzheimer



John R. Jurgensen Co./  
Valley Asphalt Corp.  
Ohio University  
Matthew Hook



The Shelly Company  
The Ohio State  
University  
Keith Knuppel



Burgett Family/  
Kokosing Construction  
Co., Inc.  
Bowling Green State  
University  
Audra Lewis



Burgett Family/  
Kokosing Construction  
Co., Inc.  
Ohio University  
Jill Morrison



Erie Blacktop, Inc.  
Ohio University  
Katherine Peksa



Northstar Asphalt, Inc.  
Ohio University  
Eric Reed



Gerken Paving, Inc.  
Ohio Northern  
University  
Benjamin Rowland



Erie Blacktop, Inc.  
University of Akron  
Jason Scouten



The Shelly Company  
Ohio University  
Daniel Shonk



Ohio Cat and  
Caterpillar, Inc.  
University of  
Cincinnati  
Kenneth Welsker



Gerken Paving, Inc.  
University of Toledo  
Jason Wielinski

# Seminar & Conference Season Approaching



Concurrent Seminars and Workshops

Winter is the prime season for asphalt continuing education. Mark your calendars now for these important conferences:

The **Ohio Asphalt Paving Conference**, Feb. 3, 2005, at the Fawcett Center on the Ohio State University campus in Columbus. This is the must-attend technical conference for public



General Sessions



Seminars

agencies and the consultants and contractors who serve them.

**Flexible Pavements of Ohio, 43rd Annual Meeting and Equipment Exhibition**, March 30 and 31, 2005, at the Ramada Plaza Hotel and Conference Center in Columbus. This is the convention of the asphalt pavement industry in Ohio. Besides the trade and equipment show, the conference features concurrent seminars and workshops and a full slate of general technical sessions on issues of importance to the industry.

Watch your mailbox and/or go to [www.flexiblepavements.org](http://www.flexiblepavements.org) for the full program, announcements and registration forms for these conferences and other important educational offerings.



Equipment Exhibition



Trade Show





## Advertisers Index

<i>Asphalt Materials</i> .....	8
<i>Cantwell Machinery</i> .....	IFC
<i>Highway Rubber Products</i> .....	8
<i>Ohio CAT</i> .....	BC
<i>Protection Services</i> .....	8
<i>Southeastern Equipment</i> .....	IFC
<i>The Shelly Company</i> .....	6
<i>Valley Asphalt</i> .....	7

**Ohio**Asphalt  
P.O. Box 16186  
Columbus Ohio 43216

PRESRT STD  
U.S. POSTAGEPAID  
COLUMBUS, OHIO  
Permit #8277

## A Complete Line of Paving Solutions



**Caterpillar® manufactures a broad line of compactors, pavement maintenance and paving machinery. Our machines are designed to help you complete your work more efficiently, productively and effectively.**

**Your Caterpillar dealer is committed to providing the highest level of product support in the industry. For more details, contact Ohio CAT.**

### **For All Your Paving Needs**

**Ohio**



**800-837-6200**  
**[www.OhioCAT.com](http://www.OhioCAT.com)**