

OHIO ASPHALT

Issue 3, Volume 4

Summer 2007

Flexible Pavements Calls on Congress to Support Transportation Funding

Also in this issue:

- Frecker Honored for Contribution to Asphalt Industry
page 10
- Construction Costs Eating Away Your Program?
page 13
- 2nd Interim Report Released on Cost-Effectiveness
of Preventive Maintenance Treatments
page 14



Tight Spaces... NO PROBLEM!



USING A SMALL MACHINE DOESN'T HAVE TO COMPROMISE PRODUCTIVITY OR PERFORMANCE.

The new W 120 F cold mill from Wirtgen, the Super 700 asphalt paver from Vögele America, and the HD 12 roller from Hamm Compaction Division are proving that small machines can provide big performance, convenience and profitability in tight spaces and on tight schedules.

Don't let the compact size fool you; these small machines get **BIG** results.



The McLean Company
6681 Chittenden Road
Hudson, Ohio 44326
Phone: 330-655-5900
Fax: 330-655-5969

The McLean Company
3155 E. 17th Avenue
Columbus, Ohio 43219
Phone: 614-475-2880
Fax: 614-475-0069

The McLean Company
8131 Regal Lane
West Chester, Ohio 45069
Phone: 513-777-5556
Fax: 513-777-4494

OHIO ASPHALT

SUMMER 2007

- 5 President's Page
- 6 Flexible Pavements Calls on Congress to Support Transportation Funding
- 9 2007 OTEC Set for October 23-24
- 10 Frecker Honored for Contribution to Asphalt Industry
- 12 Roadmap to Guide Future HMA Research
- Special Insert**
Technical Bulletin: Cold Weather Paving
- 13 Construction Costs Eating Away Your Program?
- 14 2nd Interim Report Released on Cost-Effectiveness of Preventive Maintenance Treatments
- 18 Pavement Standards for Local Roads & Streets
- 20 Legal Corner
Dugans & Meyers: Ohio Supreme Court Rules for Public Owner
- 21 Risk Management 101 for Highway Contractors
- 23 Index to Advertisers



page 10



page 18



page 21

ON THE COVER: *FPO President and Executive Director Cliff Ursich confers with Congressman Steve LaTourette in his Washington, D.C. office May 9 during the 2007 TCC Fly-In.*



Flexible Pavements of Ohio is an association for the development, improvement and advancement of quality asphalt pavement construction.
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; web site: www.flexiblepavements.org

Officers

Chairman

Brent Gerken
Gerken Paving, Inc.

Co-Chairman

Douglas C. Rauh
The Shelly Co.

Treasurer

Frank T. Bell
M&B Asphalt Co., Inc.

Board of Directors

Wayne Brassell
Kokosing Construction Co., Inc.

James P. Jurgensen
Valley Asphalt Corp.

Gerald N. Little
Shelly & Sands, Inc.

James S. Tharp
The Shelly Co.

Michael D. Thompson
Barrett Paving Materials, Inc.

Howard J. Wenger
Northstar Asphalt Co.

Dean Wikel
Erie Blacktop, Inc.

Staff

Clifford Ursich, P.E.
President & Executive Director

William H. Fair, P.E.
Director of Engineering Services

Florence H. Flowers
Executive Assistant

Jerry Wray, P.E.
V.P. of Government Relations

Telephone: 614-221-5402; 888-446-8649
(Ohio only)

Fax: 614-221-0394

Website: www.flexiblepavements.org

Layout & Design
Danielle Neil

Advertising Sales
Megan Brown

Editorial Staff
Jerry Marks

Ad Sales & Editorial Preparation
TRIAD, Inc.

371 County Line Road West
Westerville, OH 43082
614.846.8761 or 1.800.288.7423
fax: 614.846.8763
editorial e-mail: editorial@triad-inc.com
advertising e-mail: sales@triad-inc.com

kokosing

Tradition ■ Excellence ■ Quality ■ Innovation

Asphalt plants located in:

- Columbia Station
- Columbus
- Delaware
- Fredericktown
- Garfield Heights
- Mansfield
- Medina
- Sheffield
- St. Louisville
- Westerville
- Wooster

AMRL Certified
laboratory
testing facility

and
SPS Polymer
manufacturing
plant located in
Mansfield

Liquid AC facilities located in:

- Mansfield
- Wheelersburg

Asphalt Paving

Regional offices:

- Cleveland
(216) 587-4900
- Elyria
(440) 322-2685
- Mansfield
(419) 524-5656
- Westerville
(614) 212-5700



**KOKOSING
MATERIALS INC.**

P. O. Box 334 • Fredericktown, Ohio 43019-0334
Phone: 740.694.9585 • Fax: 740.694.1100
www.kokosingmaterials.biz

kokosing
CONSTRUCTION COMPANY INC.

P. O. Box 226 • Fredericktown, Ohio 43019-0226
Phone: 740.694.6315 • Fax: 740.694.1481
www.kokosing.biz

**GET MORE WORK DONE.
SPEND LESS
DOING IT.**



GET A VOLVO.

The new generation, state-of-the-art Volvo B Series Excavator is the most fuel-efficient, most productive excavator in the business.

Call your dealer for more reasons to get a Volvo.
www.volvoce.com

MORE CARE. BUILT IN.



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

Email: info@cantwellmachinery.com Website: www.cantwellmachinery.com
Authorized Volvo Construction Equipment Dealer

BEING SUCCESSFUL WITH ASPHALT!



CLIFFORD URSICH
President &
Executive Director

In recent travels to ODOT, visiting our industry's largest customer, we've pledged to do what we can to help ensure its success with asphalt. Though ODOT buys a lot of asphalt, local governments, commercial and private buyers comprise the majority of asphalt sold in the state — and to all, we make the same pledge. They all have similar goals: to deliver high-quality economical pavement to their constituents and patrons. Ensuring our customer is successful with asphalt is all about helping them achieve their goals and initiatives. Permit me license with a pearl of wisdom. When our customer is successful we're all successful; and that goes a long ways in ensuring the continued use of asphalt pavement.

What are some of the goals and initiatives of our customers? In our travels we heard some recurring themes. The most prevalent was "be frugal." We all are aware of the effect high energy prices have had on fixed construction budgets and the need for more revenue. To that end, in May, FPO participated in the Transportation Construction Coalition Legislative Fly-In to Washington, D.C., where we urged our congressional delegation to support transportation funding to its highest level. Though considerable support existed for full-funding in 2008, there was little enthusiasm to address Highway Trust Fund shortfalls expected to occur in 2009. FPO will do its part to encourage our representatives both in D.C. and in the Statehouse to squarely face the issue. Recently the National Asphalt Pavement Association reported of Virginia Commonwealth Transportation Board's bold vote to allocate \$11 billion to projects — a 41-percent increase in transportation funding. Their's is a courageous move.

Here on the home front, transportation professionals are thinking about how to stretch the dollar; a good thing always to consider. Here's one where asphalt can help our customers be successful. In leaner days gone by, thin hot-mix overlays of 1-inch thickness had traditionally stood in the gap to preserve pavement condition; and did so, successfully! Fortunately, with the development of Smoothseal™, ODOT Item 424, that same opportunity presents itself today. In fact, interim research results demonstrate 424 is more than just effective at preserving pavement condition; it has the lowest lifecycle cost of all thin surface treatments being evaluated under ODOT's Preventive Maintenance Process Analysis.

Ingenuity is essential to attaining success with asphalt. Since the 1994 FPO Strategic Plan was implemented under the leadership of former FPO Executive Director Fred Frecker, Flexible Pavements has ridden a wave of quality improvements. Those improvements have resulted in improved pavement longevity and performance. With those improvements, however, have come increased cost; it's time to unleash ingenuity to mitigate further cost increases. Within RAP (recycled asphalt pavement), a treasure trove of savings waits to be tapped. The asphalt binder and aggregate in RAP is more valuable today than it was when it was initially placed, and capturing its value will make significant strides to reducing cost. To help agencies be successful with asphalt, Flexible Pavements is actively pursuing development of mixtures that fully utilize this resource. Agencies that are using less RAP than ODOT specifications may want to run the numbers on cost savings. A 20-percent RAP mix buys an additional mile for every nine purchased.

Here are some other cost savers:

1. Polymer modified binders are costly but effective, and necessary tools in ensuring good pavement performance. Their use should be judicious. A strategy that will get you there is one such as that described in the article "Pavement Standards for Local Roads and Streets," beginning on page 18.
2. Pavements with inexhaustible structural life, with only the need for surface restoration, sounds like a real long-term money saver. Indeed, and that is what the Perpetual Pavement design system seeks to accomplish. Research on U.S. Route 30 in Wayne County is showing promise, as results are confirming the Perpetual Pavement design concept.

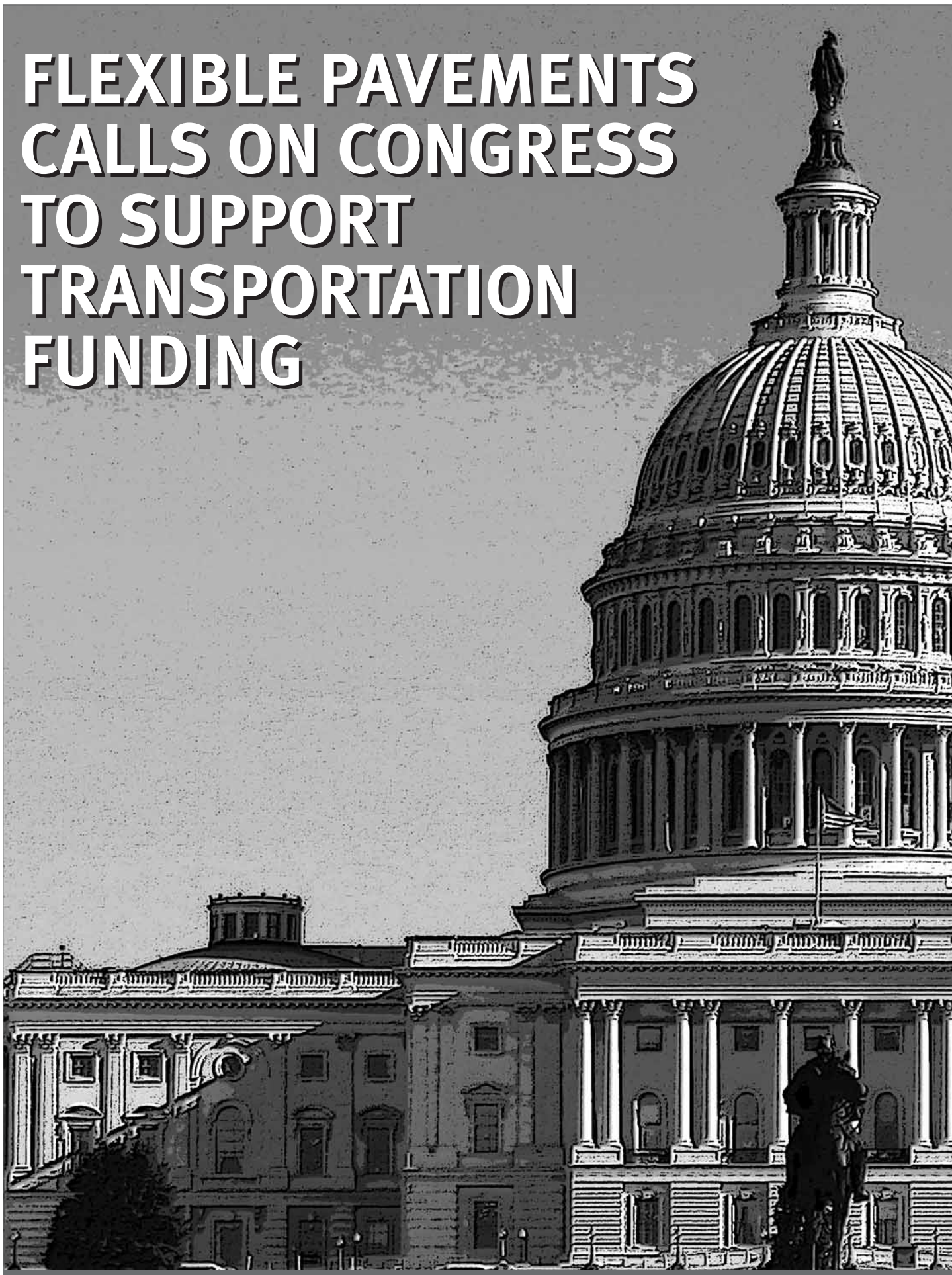
Like precious jewels, ingenious ideas are out there just waiting for discovery; and by all means if you would like to sound off on one please pick up the phone and give us a call.

The collective interest of all parties is well served through wise stewardship, ingenuity, and high-quality construction practices. That's good for buyers of hot mix asphalt, and that's good for producers alike.

Let's be successful with asphalt!



FLEXIBLE PAVEMENTS CALLS ON CONGRESS TO SUPPORT TRANSPORTATION FUNDING



Flexible Pavements of Ohio joined with a team of Ohio associations, contractors and consultants to participate in the 2007 Transportation Construction Coalition (TCC) Legislative Fly-In, May 8 and 9, to carry the message to Congress regarding the need for full funding for transportation investment.

FPO and its partners called upon members of the Ohio delegation on the public works and transportation committees including: senators George Voinovich and Sherrod Brown and representatives David Hobson, Steven LaTourette, Charles Wilson, Pat Tiberi, Zachary Space and Jean Schmidt.

The reason for the visit was to seek Ohio representatives' support for preventing a reduction in anticipated federal transportation funding. Current estimates show that revenues to the Highway Trust Fund (HTF) may not be adequate to support the level of funding authorized under SAFETEA-LU as early as federal fiscal year 2009. As a result, the USDOT has proposed appropriations of less than the amounts authorized under SAFETEA-LU for the remaining years covered by the current federal transportation funding bill (through FY 2010). In spite of that recommendation, Congress has already appropriated the full amount for FY 2007, albeit five months late. Ohio's congressional delegation seems to believe that the full SAFETEA-LU amount will be appropriated for 2008. The picture for 2009 and beyond is not as clear as there seems to be less sentiment for increasing revenue to the HTF.

By the needs estimates prepared by the USDOT, the funding levels authorized under SAFETEA-LU were already far from adequate to



FPO President and Executive Director Cliff Ursich confers with Congressman Steve LaTourette in his Washington, D.C. office during the 2007 TCC Fly-In.

ODOT Business Plan 2006 & 2007 - Addendum 12

- Cancelled the widening of Interstate 70 in Clark County, saving \$54 million
- Deferred, at least until 2012, the widening of I-75 in Toledo, which deferred \$120 million
- Cancelled funding for a transit bus/train station in Columbus, after the area transit authority cancelled plans to build a light rail line; saving \$13.1 million
- Cancelled the upgrade for the State Route 237 interchange serving Cleveland-Hopkins Airport, due partially to ongoing changes in the Airport's master plan; saving \$12 million
- Changed the schedule and sequence of the I-270/U.S. Route 23 interchange upgrade in Franklin County, moving projects which were scheduled for 2009 and 2011, to 2011 and 2013; deferring in total \$121 million
- Delayed funding for I-275/S.R. 32 interchange in Clermont County from 2010 to 2011, deferring \$49 million
- Delayed funding for I-75 in Hamilton County from 2010 to 2012, deferring \$80 million

meet the nation's transportation investment needs. Congress had originally proposed a far higher level of investment; however, agreement could not be reached on increasing user fees to support that level. This funding shortfall, coupled with the recent rapid increases in the cost of energy and basic construction materials, means that further funding cuts would be devastating to the U.S. economy.

In a September 2006 addendum to its 2006-7 business plan, ODOT addressed the effect that shortfalls in anticipated federal funding and construction cost inflation were having on the program. This included the cancellation or delay of nearly \$450-million worth of major-new projects in Ohio. FPO carried this information to the Ohio congressional delegation as a "close to home" illustration of the needs for full-funding of transportation. (For the specific list of



delayed and cancelled projects, and further discussion, see: <http://www.dot.state.oh.us/BusinessPlan0607/BusinessPlan06-07Addendum-Sept.pdf> and this article's accompanying sidebar of specific project deferments and cancellations.)

At the meeting, Sen. Voinovich explained his vision for a more comprehensive approach to funding the infrastructure needs of the country. To that end, senators Voinovich and Hillary Clinton are co-sponsoring a senate bill titled "National Infrastructure Improvement Act of 2007." The proposed law would establish a national commission to study the needs for infrastructure to sustain long-term economic growth. Under the draft bill the commission would be required to report to Congress by Feb. 15, 2010. View the text of the draft bill at <http://www.flexiblepavements.org/documents/NIC.pdf>.

Flexible Pavements of Ohio urges its members to continue to remind the state's congressional representatives of the very real need for additional investment in Ohio's transportation system and to support their efforts to provide that funding.

OA

THE SHELLY CO. THORNVILLE, OHIO

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

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

FACILITIES THROUGHOUT OHIO

Website: www.shellyco.com

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

2007 OTEC SET FOR OCTOBER 23-24

Ohio's largest transportation trade show to be held in Columbus



Mark your calendar now for the Ohio Transportation Engineering Conference, Oct. 23-24, 2007, at the Greater Columbus Convention Center. Flexible Pavements of

Ohio will be exhibiting in the largest

transportation trade show in Ohio and presenting two technical sessions devoted to asphalt pavement technology.

At the 8:30 a.m., Wednesday, Oct. 24th, session, FPO Executive Director Clifford Ursich will moderate a session devoted to the recycling of tire rubber into hot mix asphalt pavement with the following presentations:

ODNR/DRLP Scrap Tire Grant Program

(8:30-9:15 a.m.)

Presenter: S. Matthew Dummitt, Market Development Coordinator, Ohio Department of Natural Resources, Division of Recycling and Litter Prevention.

Description: Among other purposes, the Scrap Tire Grant program provides financial assistance to Ohio's local governments to utilize scrap tire material in civil engineering projects. This presentation will discuss the particulars of the Grant Program.

Grant Money Funds Franklin County Resurfacing Project

(9:15-10 a.m.)

Presenter: Dean C. Ringle, PE, PS, Franklin County Engineer

Description: The Franklin County Engineer's Office was awarded \$91,698 by the ODNR/DRLP for its Frank Road project that will utilize a new technology called "Terminal Blended Ground Tire Rubber." This presentation will discuss the county's experience with the grant process, the GTR technology and the construction of Frank Road.

In the 10:30 a.m., Wednesday, Oct. 24th, session, FPO Vice President of Government Relations Jerry Wray will be moderating the following slate of topics and speakers:

Do You Really Plan To Resurface this Same Road Again in Seven Years?

(10:30-11 a.m.)

Presenter: Brian S. Driscoll, Chief Highway Design Engineer, Cuyahoga County Engineer's Office

Description: This session will focus on resurfacing existing pavements, from two-lane full-depth flexible ditched rural roads to five-lane concrete curbed urban roads, examining the current practices and experiences of the Cuyahoga County Engineer's Office.

Mitigating Rising Costs of Asphalt Pavements

(11-11:30 a.m.)

Presenter: David E. Newcomb, PE, PhD, Vice President - Research & Technology, National Asphalt Pavement Association

Description: Explore ways of mitigating the rising cost of asphalt paving. This presentation will discuss alternative mixes, recyclable materials, asphalt binder selection, and thickness design considerations that can reduce cost.

Warm Mix Asphalt European Scan Tour

(11:30 a.m.-noon)

Presenter: Wayne Jones, PE, Field Engineer, Asphalt Institute

Description: The findings from a summer 2007 scanning tour of Warm Mix Asphalt technology in Europe will be presented. WMA has the promise of aiding compaction at reduced mix temperatures thus allowing for energy conservation and potential fume reduction.



FRECKER HONORED FOR CONTRIBUTION TO ASPHALT INDUSTRY

Fred F. Frecker, past president and executive director of Flexible Pavements of Ohio, was honored by his colleagues for his contribution to Ohio's and the nation's asphalt industry. Frecker, who retired March 31, is well known for his commitment to quality asphalt pavement construction, innovation and the advancement of the industry's future through education.

Frecker took the helm of FPO in February 1992, and Flexible Pavements began a journey that would take it to the next level. Coming from the "public side" as the former Montgomery County Engineer, Frecker had an understanding of hot mix asphalt pavements, but equally important he carried with him a customer's perspective. An intense passion on delivering quality asphalt pavement became a driving force in all FPO activities.

At a retirement party, held March 29, family, friends and industry executives gathered at the Columbus Hilton to honor Frecker for his significant contribution. Presentations were made by Chairman of the FPO Board of Directors Brent Gerken, former Board member Don Weber, former ODOT Director Jerry Wray, son Allen Frecker, National Asphalt Pavement Association (NAPA) President Mike Acott, Asphalt Institute President Peter Grass, Success Group President Dan McCarthy and FPO staff member Cliff Ursich.

The evening began with proclamations from the Governor's Office, the Ohio Senate, and Ohio House, which were presented by McCarthy, whose Success Group is FPO's lobbying firm. The proclamations listed the contribution to Ohioans that Frecker's



Fred Frecker, who served as FPO President & Executive Director for the past 15 years, received several proclamations congratulating him for his service to Ohio's and the nation's asphalt industry.

public and private service has provided. Weber, who was instrumental in Frecker's hiring, reminisced of those days and the confidence the Board of Directors expressed in Frecker's abilities and that history has demonstrated they hired the right candidate.

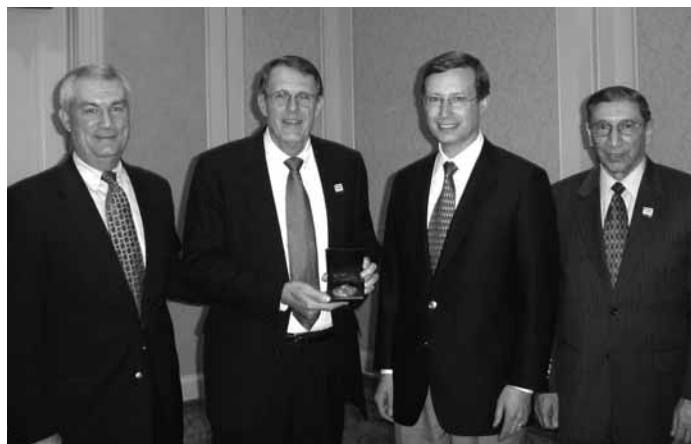
The early 1990s could best be described as times of re-established priorities. Charged by the Board of Directors to take on concerns over

waning product quality, Frecker advanced the concept of an industry strategic plan and saw it to fruition. That plan, developed in 1994, focused on the issue of quality; quality materials, construction and a workforce capable of delivering high-quality asphalt pavements. Like the wake of a boat traveling to the outermost banks, so has that strategic plan contin-



Frecker receives congratulations from Success Group President Dan McCarthy (middle).

ued to make an impact. Someone once said, "Without data you're just another opinion." That was true of Frecker, remarked Wray, who noted his appreciation of the professionalism of Flexible Pavements, and that under Frecker's leadership ODOT was treated like a customer. Wray added that Frecker's arguments on behalf of FPO, for or against an issue or decision, were always supported by irrefutable data.



Frecker was honored by the Asphalt Institute's (left) Wayne Jones, a field engineer, President Peter Grass and Jorge Villacres, a retired field engineer.

Joining him in this evening of celebration were Frecker's wife, Theresa, daughter, Mary, sons Joe and Allen, in-laws and grandchildren. Allen spoke of his father's commitment to family, saying his dad led at home by example. The commitment to character, doing what was right, was something Allen said Frecker lived both at home and work. Congratulating his father and welcoming him into full-time grandfather status, Allen added that his dad would not permit his priorities to be compromised and he instilled this in his children.



Frecker and his wife, Theresa, enjoy the festivities at his retirement party held March 29 at the Columbus Hilton.

NAPA and the Asphalt Institute both honored Frecker for his contributions nationally. The Asphalt Pavement Alliance, an alliance consisting of NAPA, the Asphalt Institute and the State Asphalt Pavement Associations, was founded to further advance asphalt pavement construction; Frecker played a role in conceptualizing the APA. An "Asphalt Oscar" was presented to Frecker for his "performance" in fending the industry's competition and sustaining market

share. A token of appreciation was presented by the Asphalt Institute, and in his remarks, President Grass noted that the impact of Frecker's leadership in the asphalt industry extends beyond the borders of Ohio and the nation.

Staff remarks were made by Ursich who spoke of the character, work ethic and enthusiasm Frecker brought to his work every day. The current FPO President/ Executive Director

added that Frecker's output could not be matched, his work was done with passion and everything had to line-up with a moral compass. "Fred had a passion for quality exemplified by the many accomplishments in mixture and construction improvements," Ursich said. "Fred also had a passion for innovation; which brought Stone Mastic Asphalt, polymer-modified asphalt, Perpetual Pavement and Warm Mix Asphalt to Ohio." It was also noted that by closely working with Ohio's universities, Frecker advanced asphalt research and was successful in getting asphalt curriculum taught.

On behalf of the association's membership, FPO Chairman Brent Gerken presented a gift to Frecker. Gerken spoke of the membership's appreciation for all that Frecker accomplished during the past 15 years and the new level to which he brought the association during his tenure as President/Executive Director.

The FPO membership wishes Fred well as he enters his new role as retiree and full-time grandpa.

OA



FPO Board of Directors Chairman Brent Gerken presents Frecker a gift of appreciation from association members.

ROADMAP TO GUIDE FUTURE HMA RESEARCH

The National Asphalt Pavement Association (NAPA) and its partners have published a draft report on the future needs for asphalt pavement research titled the “Asphalt Roadmap.” The following descriptions are drawn from that report.

The vision that led to the development of the Roadmap was to “Develop improved asphalt pavement technologies that ensure the continued delivery of safe and economical pavements to satisfy our Nation’s needs.” The purpose is to serve as a guiding document to research and technology transfer organizations and agencies in the formulation and identification of programs and projects. Individuals and groups are encouraged to draw upon and share this document.

Seven basic program areas and objectives were chosen as the major components of asphalt technology research for improving pavement performance, life and economics. They are:

1. **Workforce Growth and Development** – Develop strategies to recruit, retain, and develop the HMA workforce. Four project topics are proposed for this program area including the establishment of measures of the knowledge needed by technical and skilled workers and improved training for industry workers.
2. **Long-Life Pavements and Pavement Performance** – Verify and improve technology for long-life pavement structural design, materials optimization, lifecycle-cost analysis, and data collection techniques for pavement evaluation. Projects proposed include: improved rehabilitation for long-life; Mechanistic-Empirical design; validating the fatigue limit for hot mix asphalt; and six other project topics of research and development for a total of nine project topics.
3. **Improved Structural Design of Pavements** – Develop improved design methods, which will optimize HMA pavements to accommodate future changes in traffic and materials while accounting for environmental effects. Seven projects proposed would refine design methods to fully incorporate mechanistic analysis using material properties.

4. **Materials Characterization and Mix Design** – To develop test methods, specifications and performance relationships which will lead to optimization of materials and mix design for asphalt pavements. Among the 17 projects proposed are ones intended to develop performance tests and alternative binder materials.

5. **Construction Practices and Quality Management Systems** – To develop construction practices to improve quality, increase productivity, improve safety and extend pavement life. Fifteen projects are proposed including those to improve the quality and efficiency of construction and to increase recycling.

6. **Innovative Contracting Approaches** – Evaluate the advantages and disadvantages of innovative and non-traditional financing and contracting approaches used for HMA projects. Six project topics proposed.

7. **Surface Characteristics** – To develop materials selection, design methods, quality control/quality assurance guidelines, performance relationships and mix-type selection for mixes to improve surface characteristics (friction, smoothness, splash/spray, and noise) of HMA pavements. Seven project topics are proposed including those to increase pavement friction and reduce noise.

The intent of the National Asphalt Roadmap is to identify general research projects in each of the program areas. Tasks developed under each project must lead to clear outcomes with practical, “*economical*” application. There are a total of 65 projects identified in the Roadmap within the seven program areas. To see the complete list of proposed projects and descriptions, and view the entire draft report, go to:
<http://www.hotmix.org/PDFs/AsphaltRoadmapDraftRevised.pdf>.

Flexible Pavements of Ohio will use the Roadmap plan as a guide in advocating for research projects with our partners at ODOT and Ohio’s research universities.



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
www.flexiblepavements.org

Technical Bulletin: Cold Weather Paving 1 Oct. 2004 (Rev. 30 July 2007)

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

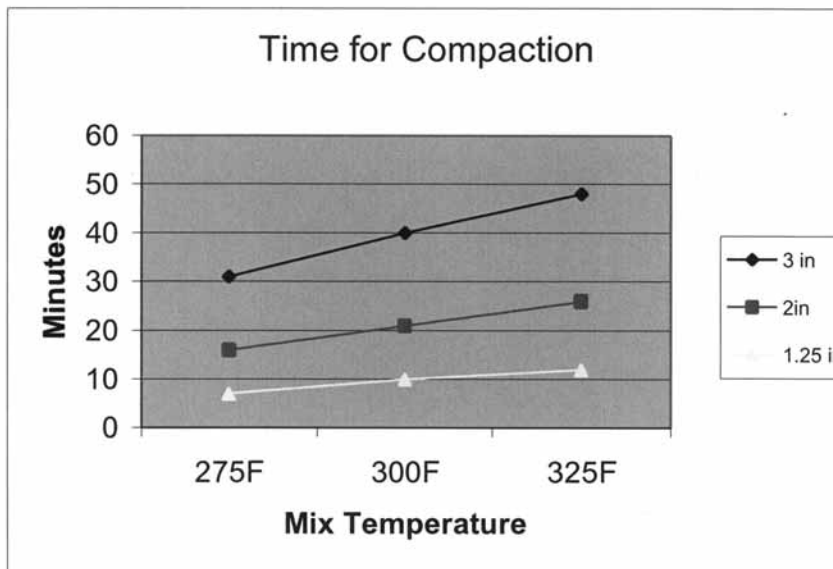
this time: air temperature, wind speed and the presence or absence of sunlight. The type and temperature of the surface on which the HMA is to be placed is a factor too. But, the two most important factors are the temperature of the mix and the thickness of the course being placed. It is generally accepted 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/res_tools/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 or Item 448 with density QC) 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, 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.

Warm Mix Asphalt Technology

The asphalt paving industry is developing Warm Mix Asphalt (WMA) technologies to produce HMA paving mixtures at significantly lower mixture and placement temperatures. Several different technologies using either additives or coating processes are currently in the marketplace. For a complete description of this developing technology visit www.warmmixasphalt.org

Early experience with these WMA technologies shows potential for easier compaction at lower temperatures. These properties may serve to lengthen the time available for compaction and aid with asphalt paving in cold weather. WMA may provide another tool for coping with the challenge of paving in cold weather.

Summary and Conclusions:

HMA 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
- Use warm mix asphalt

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, US Army Corps of Engineers, et al, LC OD-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, 2nd. Edition

CONSTRUCTION COSTS EATING AWAY AT YOUR PROGRAM?

Every highway agency has been affected by the recent increases in energy and construction costs. These increased construction costs are eating away at owner agencies' ability to deliver their programs, whether they are maintenance or new construction.

Asphalt paving costs are a big part of local government programs. Many have asked, "What can be done to help control costs of paving?"

There are several things that may be done to control increasing costs. If it has been awhile since your agency reviewed its practices for specifying asphalt paving, now is an appropriate time to make that review and consider the following general ideas that may help control costs:

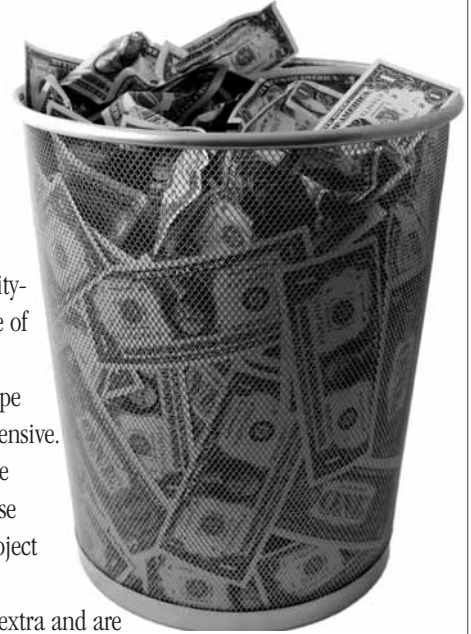
Recycle

Allow more reclaimed asphalt pavement (RAP) to be recycled into the new mix. Technology is available to successfully recycle greater percentages of RAP without compromising quality. If your agency specifications restrict the percentages of RAP below the levels permitted in ODOT specifications (441.03), significant savings may be achieved by allowing the ODOT percentages. Some other recycled materials, where available, can improve the quality of the asphalt while reducing cost. Reclaimed shingles are an example; consider allowing their use subject to your normal quality specifications.

Binder Grade, Mix Types and Layer Thicknesses

- Mixes that use larger aggregate sizes are more economical than mixes that use a finer gradation. If you could use a thicker course of a larger gradation mix and a thinner course of a smaller gradation mix to make the same pavement depth, you should be able to achieve some savings.
- Use standard mixes and binder grades for small quantities. Small quantities of special mixes and/or special binder grades can be difficult and expensive to produce. Production of small quantities

cannot be controlled using the usual quality-control processes. Use of a small quantity of a different pavement type can be especially expensive. For example, concrete ramps on an otherwise asphalt pavement project can cost hundreds of thousands of dollars extra and are unnecessary with the rut-resistant mix types that are available. Larger quantities draw smaller unit prices.



Thinner courses

If strength of the pavement is not a consideration, such as in a preventive maintenance application; then thinner courses can be a savings and still provide the surface functional characteristics needed. Special mixes are available for use in thin layers. ODOT Item 424, "Smoothseal," is gaining wide acceptance as a cost-effective, thin-overlay treatment.

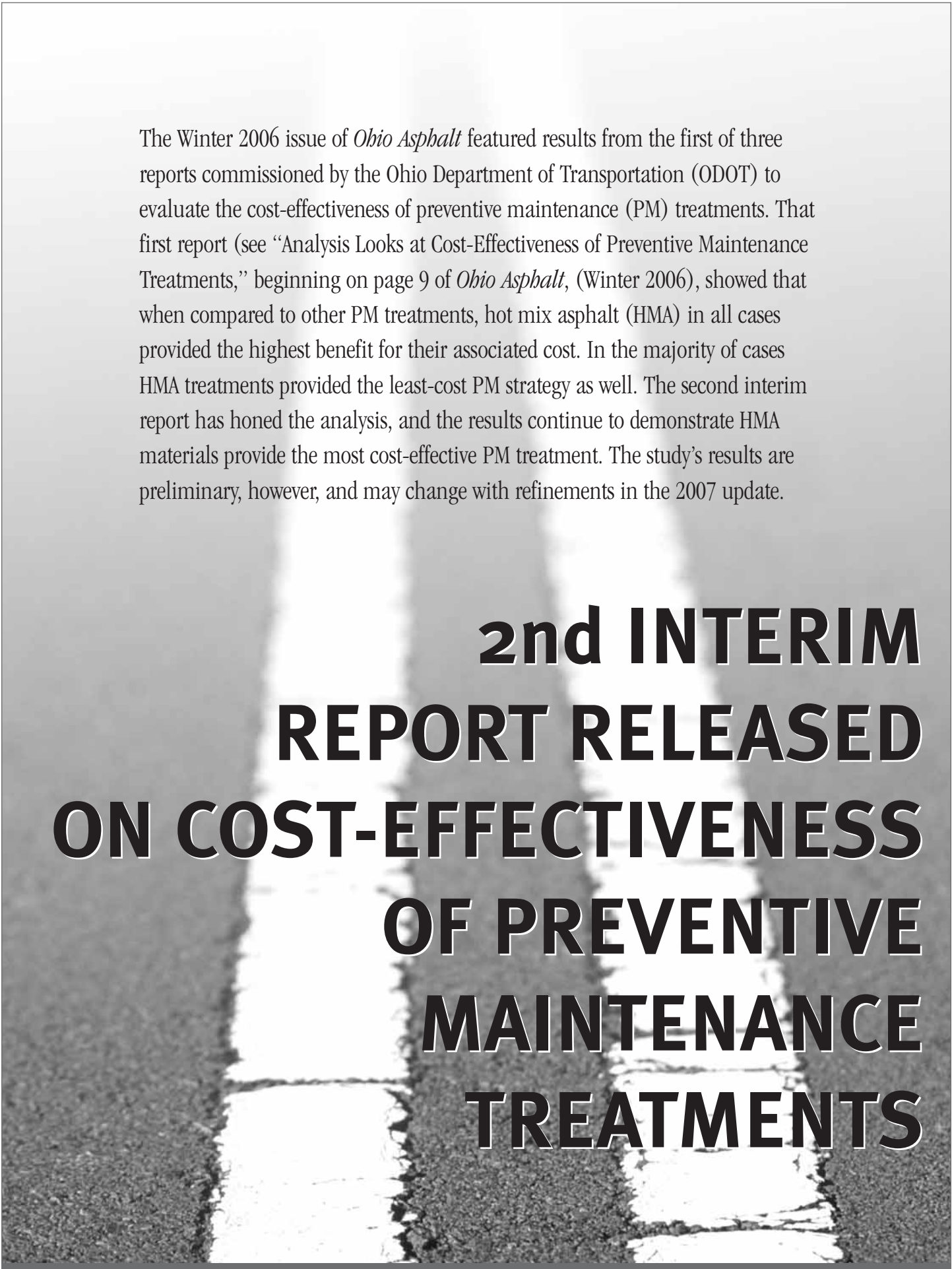
For more information on cost-saving techniques in HMA paving, see the Special Report 191 by the National Asphalt Pavement Association (NAPA), available at <http://www.flexiblepavements.org/documents/SR-191.pdf>.

With the significant increases in the cost of construction that have occurred, now is an appropriate time to analyze your paving practices to see if your objectives can be achieved more economically.

Flexible Pavements of Ohio would welcome the opportunity to provide information that you might need to aid in this re-appraisal. We encourage you to contact us by calling 614-221-5402 or 888-446-8649 (Ohio only), by fax at 614-221-0394, or by e-mail at info@flexiblepavements.org.



The Winter 2006 issue of *Ohio Asphalt* featured results from the first of three reports commissioned by the Ohio Department of Transportation (ODOT) to evaluate the cost-effectiveness of preventive maintenance (PM) treatments. That first report (see “Analysis Looks at Cost-Effectiveness of Preventive Maintenance Treatments,” beginning on page 9 of *Ohio Asphalt*, (Winter 2006), showed that when compared to other PM treatments, hot mix asphalt (HMA) in all cases provided the highest benefit for their associated cost. In the majority of cases HMA treatments provided the least-cost PM strategy as well. The second interim report has honed the analysis, and the results continue to demonstrate HMA materials provide the most cost-effective PM treatment. The study’s results are preliminary, however, and may change with refinements in the 2007 update.



2nd INTERIM REPORT RELEASED ON COST-EFFECTIVENESS OF PREVENTIVE MAINTENANCE TREATMENTS

Commissioned by Legislative mandate, the Preventive Maintenance Process Analysis seeks to determine the cost-effectiveness of various PM treatments and the timing at which a treatment application ensures maximum benefit. Treatments evaluated in the second interim report include: chip seal, single & double microsurfacing, Novachip®, Smoothseal™, Thin (less than 2-inch) HMA overlay with no repairs, and Thin HMA overlay with repairs. Double microsurfacing and Smoothseal™, previously excluded from the first report, are included in the second report's findings.

Determining Effectiveness of PM Strategies

A PM treatment has two measures of effectiveness. One measure is its effectiveness at reducing maintenance cost over a pavement's life (i.e. low lifecycle cost). The second is the benefit the treatment provides as measured by ride quality, visual pavement condition, noise reduction, user-delay mitigation, skid resistance, etc. For purposes of the ODOT study visual pavement condition rating (PCR) was the only factor used in assessing benefit.

Cost-effectiveness of the treatments is being evaluated by using a traditional lifecycle cost (LCC) method, and by measuring benefit/cost of the treatments. Lifecycle cost is defined in the ODOT study

as the total cost of maintaining a pavement during a 35-year period. When comparing treatments, the treatment that provides the lowest lifecycle cost is preferred. Benefit/cost is an evaluation of benefit received from a treatment versus its associated cost; sometimes this is referred to as benefit-to-cost ratio. If the benefit from a treatment is greater than its cost the treatment's use is justifiable, provided it has the lowest lifecycle cost when compared with the alternative treatments, and a non-PM strategy.

2nd Interim Report

The second interim report saw changes in the treatment evaluation process. ODOT's method of classifying its pavements (whether priority, general, or urban) was deleted as a filter. Treatments were evaluated for their performance when applied to deep-strength asphalt pavements (flexible pavements) and composite pavements (concrete covered with asphalt). Treatment performance was determined for pavements in fair condition ($70 < \text{PCR} < 80$) and pavements in good condition ($80 < \text{PCR} < 90$). Low levels of traffic (< 1 million ESALs/Yr) and performance under high-traffic levels (> 1 million ESALs/Yr) were also considered. Generally, treatments placed on low-traffic pavements in good condition will perform best. Treatments placed on flexible pavement generally perform better than

Table 1: Summary of Cost-Effectiveness (\$/SY) as Measured by Lifecycle-Cost

| Pavement Type: | Flexible | | | | Composite | | | |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|
| Condition: | Fair | | Good | | Fair | | Good | |
| Traffic Level: | Low | High | Low | High | Low | High | Low | High |
| Control (non-PM) | \$23.44 | \$26.61 | \$23.44 | \$26.61 | \$22.88 | \$ 30.27 | \$ 22.88 | \$ 30.27 |
| Chip Seal | \$21.49 | | \$22.97 | | | | | |
| Single Microsurfacing | \$22.35 | | \$23.47 | | \$21.64 | | \$ 23.92 | |
| Double Microsurfacing | \$23.07 | \$25.67 | \$24.28 | \$27.40 | \$22.31 | \$ 29.58 | \$ 24.73 | \$ 32.18 |
| NovaChip® | \$22.60 | \$23.60 | \$24.28 | \$26.92 | \$23.75 | \$ 28.60 | \$ 26.92 | \$ 31.16 |
| Smoothseal | \$21.39 | \$22.73 | \$22.92 | \$25.89 | \$21.03 | \$ 25.92 | \$ 23.77 | \$ 28.24 |
| Thin HMA Overlay with No Repairs | \$22.68 | \$25.06 | \$23.47 | \$27.88 | \$22.28 | \$ 28.55 | \$ 24.75 | \$ 30.41 |
| Thin HMA Overlay with Repairs | \$22.24 | \$23.61 | \$23.90 | \$26.99 | \$21.75 | \$ 26.30 | \$ 24.69 | \$ 28.75 |

treatments placed on composite pavement. PCR regression models developed in the study confirm these. Reflection cracking typical of composite pavements, and to a lesser degree some flexible pavements, plays a large role in substandard PM treatment performance.

Tables 1 and 2 provide summaries of cost-effectiveness determined in the Study's second interim report. Included is a "control" option. The control option is a non-PM maintenance strategy. It serves as a benchmark by which comparisons can be made of the cost-effectiveness of the various PM treatments. The costs shown in the tables are in units of dollars per square yard. Table 1 provides the cost-effectiveness of treatments as measured by lifecycle cost. Table 2 provides the cost-effectiveness as measured by benefit cost. Recall, when evaluating lifecycle cost, the lower the cost per square yard the greater is the savings in dollars and the more preferred the alternative. When evaluating Benefit Cost, the higher the dollar value per square yard the greater is the benefit received and the more preferred the alternative. Highlighted cells in

the tables are the costs per square yard associated with treatments having either the lowest lifecycle cost (Table 1) or greatest benefit/cost (Table 2).

Observations from Table 1: Summary of Cost-Effectiveness as Measured by Lifecycle-Cost

- The Smoothseal™ treatment provided the lowest lifecycle cost for all pavement types, conditions and traffic levels except composite pavements in good condition having low-traffic levels.
- The control option (non-PM) provided the lowest lifecycle cost for the composite pavement in good condition having low traffic.
- The lifecycle costs of Smoothseal™ and chip seals placed on low-volume flexible pavements in both fair and good condition were near equivalent.

The New Caterpillar® AP-655D Asphalt Paver



Setting standards in performance, operator comfort, ease-of-use, mobility and reliability.

- Routine commercial jobs to demanding highway operations
- Dual swing-out operator stations with tilting consoles
- Mobil-trac™ undercarriage offers increased traction, less ground pressure and better flotation
- Three steering modes provide ultimate mobility and maneuverability

CADIZ
800.837.6204

CINCINNATI
888.332.4658

COLUMBUS
888.441.4658

NORTHERN KY
888.446.4658

TOLEDO
888.339.4658

YOUNGSTOWN
800.837.6203

CANTON
800.837.6207

CLEVELAND
800.837.6200

LUCASVILLE
888.336.4658

PAINESVILLE
888.901.6620

TROY
888.330.4658

ZANESVILLE
800.837.6205

Ohio CAT

www.OhioCAT.com

Table 2: Summary of Cost-Effectiveness (\$/SY) as Measured by Benefit Cost

| Pavement Type: | Flexible | | | | Composite | | | |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Condition: | Fair | | Good | | Fair | | Good | |
| Traffic Level: | Low | High | Low | High | Low | High | Low | High |
| Control (non-PM) | \$43.36 | \$42.12 | \$43.36 | \$42.12 | \$42.14 | \$35.97 | \$42.14 | \$35.97 |
| Chip Seal | \$52.08 | | \$48.85 | | | | | |
| Single Microsurfacing | \$48.97 | | \$47.24 | | \$49.13 | | \$46.16 | |
| Double Microsurfacing | \$47.44 | \$44.10 | \$45.66 | \$40.87 | \$47.66 | \$34.22 | \$44.65 | \$29.72 |
| NovaChip® | \$49.30 | \$49.23 | \$46.95 | \$42.88 | \$45.52 | \$37.68 | \$39.26 | \$33.16 |
| Smoothseal | \$52.28 | \$51.32 | \$49.91 | \$44.79 | \$50.47 | \$42.96 | \$45.55 | \$38.54 |
| Thin HMA Overlay with No Repairs | \$48.69 | \$46.63 | \$48.12 | \$39.79 | \$47.83 | \$37.80 | \$43.82 | \$35.13 |
| Thin HMA Overlay with Repairs | \$50.77 | \$49.92 | \$48.64 | \$43.86 | \$50.53 | \$43.79 | \$45.90 | \$39.74 |

Observations from Table 2: Summary of Cost-Effectiveness as Measured by Benefit Cost

- The benefit/cost of chip seals and Smoothseal™ placed on low-volume flexible pavements in fair condition were near equivalent.
- Single-course microsurfacing provided the largest benefit/cost for low-traffic-volume composite pavements in good condition.
- Flexible pavements in fair or good pavement condition and exposed to low and high-traffic volumes received the largest benefit/cost when treated with Smoothseal™.
- Thin HMA overlays with repairs provided the greatest benefit when applied to composite pavements in fair condition having low and high volumes of traffic, and good condition composite pavements exposed to high-traffic levels.

The ODOT Preventive Maintenance Process Analysis Study will be completed at the end of 2007. The results received to date are preliminary and may change with the next round of updates. Thus far HMA treatments have demonstrated an ability to be cost-competitive both in lifecycle cost and benefit/cost analyses. More data will come available and the final report issued at the close of this year will permit further refinement of the ODOT PM process. Look to

future additions of *Ohio Asphalt* as FPO tracks the cost-effectiveness of PM on Ohio pavements.



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 702 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

www.betterasphalt.com

Highway Rubber Products 330-499-2900 Email: pwelsh1000@aol.com

PAVEMENT STANDARDS FOR LOCAL ROADS & STREETS

The subject of municipal street standards came to light as an important issue through the 2005 FPO customer survey. Customers indicated a need to improve their standard designs and specifications to obtain better performance and economy from their pavements.

To address the standard design and specifications issue identified through the customer survey, FPO developed a response plan, which states:

"FPO will strive to educate local government customers on ways to improve their specifications and quality assurance to realize the most cost-effective performance of their pavements. FPO will undertake to develop a model specification and standards, based on ODOT specifications, for use by local government; that will aid them in implementing the advancements in asphalt pavement technology in a practical and economical way."

The complete Customer Survey Response Plan was published as an insert to *Ohio Asphalt* in the Winter 2006 issue and can be viewed online at <http://www.flexiblepavements.org/documents/SurveyRpt.pdf>.

As a result, to provide guidance to local governments on asphalt pavement designs and specifications, FPO has developed a chart of typical designs and mix type selections (see page 19).

On the chart, Street Categories are identified by four alternative measures:

- Average Daily Traffic
- # of heavy trucks per day
- 20-year design ESALs and
- a verbal description.

These are intended to aid the users in determining the appropriate classification for their application. The chart also provides typical pavement build-ups and mix type specifications for two sub-grade conditions; poor soil conditions and good soil and drainage conditions.

Most local governments allow developers to choose the pavement type for their development based on the agencies' standard, equivalent



treatments. Several years ago, the City of Columbus conducted an extensive engineering evaluation to update its street standards to improve performance and economy. The results of Columbus' engineering are included in the chart for the lower-traffic categories of pavements. The Columbus-derived sections are extra stout to account for the fact that construction loads are likely the heaviest loads to which these categories of pavement will ever be exposed.

For the higher traffic and load categories of pavements, generally accepted design methods – including the AASHTO and Asphalt Institute design methods – were used to develop the pavement structural sections. The normal designs were based on a 20-year design life. The perpetual pavement design is based on in-exhaustible structural fatigue life under the heaviest legal loads.

The mix types suggested for the heavier-traffic applications are for highly rut-resistant materials needed in the typical urban arterial application; where heavy trucks stop, start and turn. Where these conditions are not present more economical materials can be specified. And, FPO must add its usual disclaimer: "if your present material specifications are giving you satisfactory results, there is really no need to change anything."

Local agencies could adopt the suggested standards with confidence in obtaining well-performing pavements. As noted in the chart footnotes, for larger projects a specific project design based upon a thorough soils investigation may produce a more economical solution than these conservative, default designs.

Municipal Standard Pavement Designs

| Average Daily Traffic | # heavy trucks/day | ESALs (20-year design) | Typical Application | Typical Pavement Build-up, Poor Soil note 1 | Typical Pavement Build-up, Good Soil and Drainage note 1 |
|-----------------------|--|------------------------|---|---|---|
| 0-500 | <25 | 27,500 | Minigreens streets and cul-du-sac with no future extensions | 1-1/4" Type 1 1-1/2" Type 2 3-1/4"-301 6"-304 notes 2, 3, 4 | Same |
| 501-1,500 | <75 | 87,500 | Non through residential streets with no future extensions | 1-1/4" Type 1 1-1/2" Type 2 3-3/4"-301 6"-304 notes 2, 3, 4 | Same |
| 1,501-3,500 | <175 | 192,500 | Through or connecting residential streets | 1-1/4" Type 1 1-1/2" Type 2 5-1/4"-302 6"-304 notes 3, 4 | 1-1/4" Type 1 1-1/2" Type 2 4-1/4"-302 6"-304 notes 3, 4 |
| <20,000 | <1,000 | 1.5m | Arterial streets | 1-1/2" 442 12.5mm Type A (446) (PG76-22M) 2-1/2" 442 19mm Type A (446) (PG76-22M) 5"-302 6"-304 notes 3, 4, 5, 6, 7 | 1-1/2" 442 12.5mm Type A (446) (PG76-22M) 2-1/2" 442 19mm Type A (446) (PG76-22M) 4"-302 6"-304 notes 3, 4, 5, 6, 7 |
| N/A | <2,000 | 4m | Heavy Industrial streets | 1-1/2" 442 12.5mm Type A (446) (PG76-22M) 2-1/2" 442 19mm Type A (446) (PG76-22M) 7"-302 6"-304 notes 3, 4, 5, 6, 7 | 1-1/2" 442 12.5mm Type A (446) (PG76-22M) 2-1/2" 442 19mm Type A (446) (PG76-22M) 6"-302 6"-304 notes 3, 4, 5, 6, 7 |
| N/A | Designed for the heaviest legal trucks | N/A (Perpetual) | Perpetual Pavement | 1-1/2" 442 12.5mm Type A (446) (PG76-22M) 2-1/2" 442 19mm Type A (446) (PG76-22M) 9"-302 6"-304 notes 3, 4, 5, 6, 7 | 1-1/2" 442 12.5mm Type A (446) (PG76-22M) 2-1/2" 442 19mm Type A (446) (PG76-22M) 8"-302 6"-304 notes 3, 4, 5, 6, 7 |

Notes:

- 1 – Soil support poor, CBR=3; good, CBR = 7, good drainage means both surface and sub-surface drainage is provided.
- 2 – From City of Columbus standards
- 3 – All binder grades PG64-22, except where noted. (PGXX-XXM designates polymer modified binder)
- 4 – If agency preference is to use full-depth asphalt on the sub-grade, delete the 6" crushed-aggregate base (Item 304) and increase the asphalt-base thickness by 2".
- 5 – These surface and intermediate courses are highly rut-resistant materials. If high-stress conditions (starting, stopping, turning heavy vehicles) are not present, use conventional materials: 1-1/2" Type 1H (PG70-22M), 1-3/4" Type 2 (heavy) (PG64-22) and increase thickness of the 302 course accordingly.
- 6 – These pavement build-ups are intended for new construction of substantial quantity. Not all of these materials are feasible or practical for production in small quantities. There are alternatives for small quantities that can provide adequate rutting resistance. Consult your producer for recommendations.
- 7 – Larger, Heavier traffic projects can economically benefit from and should receive a detailed soil and traffic analysis and a specific pavement design.

DUGAN & MEYERS: OHIO SUPREME COURT RULES FOR PUBLIC OWNER

On April 25, 2007, the Supreme Court of Ohio released its decision in the *Dugan and Meyers* case and ruled in favor of The Ohio State University (OSU). The Court's decision appears to limit the Spearin Doctrine and places great emphasis on a contractor's requirement to their contract's notice and claim provisions.

This case arose from OSU's Fisher College of Business Project where Dugan Meyers Construction Co., Inc (Dugan and Meyers) served as the lead contractor on a \$20.9-million contract. Dugan and Meyers claimed to have incurred significant losses due to multiple design issues that ultimately delayed the project's completion.

In its decision, the Court declined to extend the Spearin Doctrine here in Ohio to "cases involving delay due to plan changes." Under the Spearin Doctrine, other courts have recognized that contractors are not responsible for the consequences of defects in the plans and specifications. Based on Dugan and Meyers, Ohio law now appears to confine the Spearin Doctrine to only those cases involving "job-site-conditions," rather than a wider spectrum of construction activities.



The Court also found that Dugan and Meyers' damages flowed from a "delay in the completion of a construction project due to plan changes." The Court then denied Dugan and Meyers' claim under the contract's No Damage for Delay provision, which was enforceable at that time.

Lastly, the Court found that Dugan and Meyers' failure to comply with the contract's change-order procedure was fatal. Specifically, the Court relied on the contract's change-order provision, which stated the contractor's failure to request

in writing an extension of time within 10 days after the occurrence of the condition necessitating the time extension "shall constitute a waiver by the Contractor of any claim for extension or for mitigation of Liquidated Damages." The Court noted that the Spearin Doctrine "does not invalidate an express contractual provision" and rejected Dugan and Meyers' argument that it was excused from complying with the specific change-order procedures set forth in the contract.

Looking forward, this decision will be used against those contractors that fail to follow the contract's terms for notice of claims and time extension requests. Unfortunately, this will probably cause contractors and owners to spend more energy and time on paperwork versus building a quality project.



By Donald W. Gregory, Esq.
Kegler, Brown, Hill & Ritter
65 E. State St., Suite 1800
Columbus, OH 43215
614.462.5400

RISK MANAGEMENT 101 FOR HIGHWAY CONTRACTORS

By Donald W. Gregory, Esq.

In an era of volatile material costs it is important for highway contractors to implement strategies to minimize their risk. While unit price contracts tend to mitigate certain risks inherent in fixed fee contracts, the contractor is still assuming the risk of cost increases and other unpredictable developments post-bid.

The first risk that contractors can minimize is the risk of subcontractors walking away from their bids. A contractor can rely upon a subcontractor's bid if he uses that price in securing the work and the price of the sub is not so low as to trigger reasonable suspicions that the sub's bid is mistaken. If a contractor has reason to believe that a sub's bid is significantly low, he has a duty to inquire further before using that number. Contractors are also cautioned to avoid "bid shopping" "or value engineering" negotiations, or perhaps even an onerous subcontract, that may relieve a sub from his bid. A sub can be forced to perform a mistaken bid or be liable for the cost increase of going to the next highest bidder if the contractor follows the guidelines above.

Contractors on Ohio public work can generally withdraw their bids within 48 hours if the bid was (1) substantially low and (2) the mistake was the result of a math error or clerical mistake.

While contractors cannot condition their bids (upon price escalation for example) when bidding public work (or their bids will be declared unresponsive), contractors can reduce their risk by obtaining firm prices in writing from their subcontractors and suppliers.



In addition, ODOT provides some relief in its specifications (401.20) if the cost of asphalt increases by more than 5 percent. In addition, some ODOT bid proposals contain notes for fuel (#520 dated 3/1/06) and steel (#525 dated 8/2/04) price increases.

Absent a contractual escalation clause like these, a contractor may be unable to pass on significant price increases. A significant price increase, alone, is generally not enough to trigger relief under the "doctrine of impracticability." Yet the impossibility of providing the materials at any cost, due to floods, hurricanes, war, terrorism and other "acts of God," generally relieves the contractor of his obligation to provide the item.

Finally, contractors can seek an equitable adjustment if conditions differ materially (1) from those indicated in the contract, or (2) those ordinarily encountered in work of that nature, if timely notice is provided of the differing site conditions.

Contractors who recognize these risks and implement effective strategies to minimize these risks will have a better chance to remain profitable in the current industry climate.

OA

Valley Asphalt

CORPORATION

11641 Mosteller Road
Cincinnati, Ohio 45241
Phone: 513.771.0820
Fax: 513.326.6759

1901 Dryden Road
Dayton, Ohio 45439
Phone: 937.293.4119
Fax: 937.293.4110

**Providing
All Asphalt
& Geotextile
Materials**

**TO ADVERTISE
IN**

**OHIO
ASPHALT**

CALL

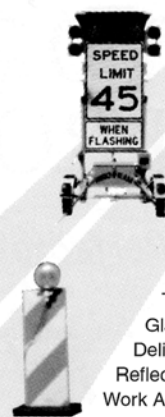
Megan Brown

at 614.846.8761 or 800.288.7423

mbrown@triad-inc.com

TRAFFIC CONTROL AND SAFETY MATERIALS

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



Sign & 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
Cleveland

Steve Fisher
Columbus

"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

Advertisers Index

| | |
|--|-----|
| ASPHALT MATERIALS | 23 |
| CANTWELL MACHINERY | 4 |
| HIGHWAY RUBBER PRODUCTS | 17 |
| KOKOSING CONSTRUCTION COMPANY, INC | 4 |
| NORTRAX | BC |
| OHIO CAT | 16 |
| PROTECTION SERVICES | 22 |
| SOUTHEASTERN EQUIPMENT | 23 |
| THE MCLEAN COMPANY | IFC |
| THE SHELLY COMPANY | 8 |
| VALLEY ASPHALT | 22 |



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"



12 Ohio Locations

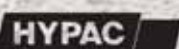
| | |
|-------------------------------------|----------------------------------|
| Cambridge 740-432-6303 | Brunswick 330-225-6511 |
| North Canton 330-494-3950 | Mentor 440-255-6300 |
| Gallipolis 740-446-3910 | Mansfield 419-529-4848 |
| Dublin 614-889-1073 | Heath 740-522-3500 |
| Monroe 513-539-9214 | Marietta 740-374-7479 |
| Perrysburg 419-874-0331 | Brilliant 740-598-3400 |



Sales - Rental - Leasing - Parts - Service

For All Your Construction & Paving Equipment Needs

Visit the Nearest Branch for Information on 2007 Leasing Programs



**Check out our NEW Parts Catalogs online
at www.southeasternequip.com**

Ohio Asphalt
P.O. Box 16186
Columbus Ohio 43216

PRESRT STD
U.S. POSTAGEPAID
COLUMBUS, OHIO
PERMIT #1560

NORTRAX



JOHN DEERE

HITACHI
SAKAI
TOWMASTER
INDECO

Powerful Products. Personalized Service.

The **best** equipment for your needs, backed by the most expedient service to provide optimum uptime. 24/7/365

**Nortrax is your high-performance, one-stop source
for quality new/used equipment, parts and service.**

In Columbus Call:

Mark Hash
Regional Sales Manager

Mike Slinger
Region V.P.

Experience the **POWER** of Deere while getting
the personalized service of a local company
who is here to serve **YOU**.

At Nortrax, **personalized service** is what we're all about.

| | | | | | |
|--------------|--------------|--------------|--------------|--------------|--------------|
| Brunswick | Canton | Cincinnati | Columbus | Dayton | Lima |
| 330-220-4999 | 866-235-0438 | 800-844-3734 | 800-222-2010 | 800-233-4228 | 800-423-7445 |