Volume 2003, Issue 1

Wednesday, February 26, 2003

THE CONCRETE conveyor

Inside this issue:

CPAM Members Honor National Award Winners, Elect New Officers

More than 80 members and guests attended the Concrete Paving Association of Minnesota's annual membership meeting at the Sheraton Four Points in St. Paul on December 11, 2002.

One highlight of the meeting included a re-presentation of ACPA National Award for Technical Innovation to Mr. David Rettner and Mr. Tom Ravn, representing the Minnesota Department of Transportation, for the I-35W High-Performance (60-Year Design) Concrete Pavement, which was constructed just south of TH62 in 2000-2001. This pavement section included stainless steel dowel bars, concrete shoulders, highly durable concrete aggregate, a low-permeability concrete mixture and one additional inch of concrete thickness to minimize the potential for durability-related distress and extend the load-carrying capacity of the road to 60 or more years.

The Ramsey County Department of Public Works was also honored with a re-presentation of their ACPA National Award for Traffic Management in the reconstruction of Larpenteur Avenue between Arona Street and Oxford Street. Accepting the award on behalf of Ramsey County were Bob Paine and Dan Soler.

Officer elections were also held and Sarah Stehly of Simplex Construction Supplies, Inc. was installed as the new President for 2003. (see page 2 for a complete list of current officers and board members)

Fred Corrigan of the Minnesota Transportation Alliance provided an excellent preview of transportation construction funding issues and positions for 2003, and KSTP-AM radio personality Paul Brand regaled the audience with an entertaining talk about roads and cars and the influence they have on our lives. Door prizes were awarded and by the time the meeting was adjourned, it appeared that a good time had been had by all! (*see page 4 for photos of the event.*)

Please join us for the next membership meeting (tentatively scheduled for December 10, 2003)!

42nd Annual Seminar Program Announced

Program announcements and registration forms for CPAM's 42nd Annual Concrete Paving Seminar have been mailed! This year's seminar – entitled "Moving Minnesota Forward … With Concrete" – is being held at the Breezy Point Resort near Pequot Lakes on March 12-13.

Several interesting sessions have been planned to address topics such as new innovations in concrete paving, "mega-projects (including a presentation on the billion-dollar I-15 reconstruction in Utah), concrete materials production and durability, pavement preservation, and concrete overlays. Attendees will have an opportunity to meet Minnesota's newest concrete pavement professors from the U of M and MSU-Mankato, and will be treated to ringside seats for an informative and entertaining "fight of the century" between "representatives" of the concrete and asphalt paving industries. The highlight of the event will be the President's Banquet and Presentation of the 2002 Concrete Paving Awards on Wednesday evening.

This seminar will feature state- and national-level speakers on a variety of topics that will be of interest to paving contractors, engineers, planners, technicians and administrators of all levels of experience. Seminar attendance records will be provided to all attendees to document professional development hours for P.E. license registration requirements.

(Continued on page 2)

County Engineers to Visit Mn/ROAD

The Concrete Paving Association of Minnesota and Mn/DOT have announced an exclusive review of the Mn/ROAD pavement testing facility for Minnesota's County Engineers. The program is free of change and will include:

- presentations by Mn/ROAD staff discussing the construction, performance and future of the various cells and designs,
- an encore presentation on the 10-year performance review of concrete and asphalt overlays on TH30 (originally presented at the 2003 Transportation Research Board Meeting in Washington, D.C.), and
- a field review and tour of the test site to allow participants to see first hand how various pavement designs perform side-by-side under identical traffic and environmental conditions.

This event is scheduled for Thursday, April 17, 2003 from 10a.m. – 2:30p.m. at the Mn/ROAD facility near Albertville, Minnesota. A boxed lunch will be provided.

A formal announcement and program will be mailed to county engineers in early March. Interested parties can register in advance by phone or e-mail with the CPAM office. Consultants, city engineers and others are also invited to attend on a space-available basis!

The Minnesota Road Research Project is the world's largest and most comprehensive outdoor pavement laboratory, distinctive for its electronic sensor network embedded within six miles of test pavements. Located 40 miles northwest of Minneapolis/St. Paul, its design incorporates 4,572 electronic sensors. The sensor network and extensive data collection system provide opportunities to study how heavy commercial truck traffic and the annual freeze/thaw cycle affect pavement materials and designs.

42nd Annual Seminar

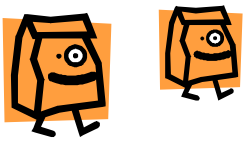
(Continued from page 1)

Full seminar registration costs only $200 for non-members ($100 for FHWA, DOT and City/County engineers and staff) and $150 for CPAM members. These prices include all handouts, Wednesday lunch, the President's banquet, and Thursday breakfast. Partial registration packages are also available.

A technical workshop on the use of HIPERPAV II, a versatile new software tool for preventing premature pavement cracking, will be held immediately following the seminar this year. This hands-on workshop is limited to 20 participants (first come, first-served) – please see the program announcement for details!

Program updates will be posted on the CPAM website at www.concreteisbetter.com -- check it out often!

We hope to see you at Breezy!



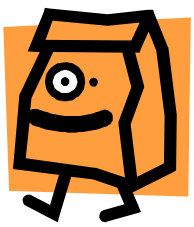
Concrete … For Lunch!

It's springtime in Minnesota, and that means that the thoughts of many engineers are turning to … logging professional development hours for continued registration!

CPAM is here to help. In addition to offering numerous seminars and workshops (such as the 2nd Annual Airport Seminar, the 42nd Annual Concrete Paving Seminar and the County Engineer's Seminar at Mn/ROAD described elsewhere in this newsletter), CPAM's highly qualified staff are available for "brown bag lunch seminars" and other in-house seminars on almost any concrete materials- or pavement-related topic.

Recent seminars at prominent area consulting firms have discussed topics such as joint layout and intersection design procedures, concrete mix design fundamentals, pavement thickness design procedures, concrete pavement evaluation and rehabilitation techniques and more. We will provide all handouts and A/V equipment – you just provide the audience!

Give us a call if you are interested in learning more about concrete pavements!



Better Roads Article Misleads Readers

Many of our readers have called to point out the page 13 sidebar article in the December 2002 issue of *Better Roads* magazine, which announced the results of a study of Kansas DOT pavement expenditures. This study, performed by faculty at the University of Kansas and *funded by the Kansas Asphalt Pavement Association*, found that asphalt rural interstate pavements were less expensive to build and maintain over a 40-year period than their concrete counterparts.

Or did it? Apparently the Kansas DOT disagreed!

KDOT's Assistant Secretary and State Transportation Engineer wrote a letter to Kansas Asphalt Paving Association citing numerous critical flaws in the study. The Engineer requested that a disclaimer be added to the report (along with identification of the study funding source) and specifically stated that "… the conclusions drawn and recommendations made in the report are not supported by the data."

Interestingly enough, the KDOT letter is dated *September 6, 2001*, more than a year before the appearance of the *Better Roads* article!! So how could a "news" article like that find its way into a reputable magazine like *BR* after the source report was so thoroughly discredited? We suspect that the answer is at the bottom of the sidebar article …

Both the *Better Roads* article and the KDOT response can be found on our website at: www.concreteisbetter.com.

You can also find on our website a copy of a paper written on the Life-Cycle Costs of HMA and PCC pavements in Olmsted and Waseca Counties. This study was funded by CPAM and was done at the University of Minnesota using data provided by the counties. Unlike the Kansas study, however, the Olmsted and Waseca county engineers have not disputed the study findings and the paper has been published nationally by the Transportation Research Board. Check it out!

Concrete Pavements Cut Fuel Consumption

A recent study, performed by the National Research Council of Canada Centre for Surface Transportation Technology (NRC-CSTT) found that heavy trucks consume significantly less fuel on concrete pavements than on asphalt pavements. Test vehicle engines were directly linked to computers to accurately monitor fuel flow and other engine outputs, and the study considered many factors, including pavement roughness, vehicle configuration, load and speed, and ambient temperature. The study report concluded that concrete pavements reduced average truck fuel consumption by as much as 11% over all temperature ranges.

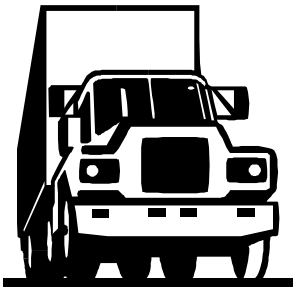
This finding agrees with the findings of several previous studies, including:

- a 1982 FHWA study that showed fuel savings of up to 20% for concrete pavements;
- an information bulletin from the Quebec Ministry of Transportation that reports 20% lower rolling resistance factors for concrete than for asphalt; and
- sensitivity analyses of Detroit Diesel software (Spec Manager v2.1) which indicates fuel economy savings of 8% for concrete over cold asphalt and 17.% percent over hot asphalt pavement when running the program with all factors constant except road surface type.

The reason for the fuel economy improvement with concrete appears to be that heavy vehicles cause greater deflection on asphalt pavements. This increased deflection appears to absorb part of the vehicle energy, thereby diverting energy from forward propulsion of the vehicle.

The study also found that trucks burned 10% less fuel on smooth roads (IRI < 1m/km) than on rougher roads, *regardless of the pavement type*. It also found that asphalt pavements that were initially smooth became significantly rougher after one winter than concrete pavements. Therefore, the increase in roughness of the asphalt pavements could increase the fuel consumption of heavy trucks on these roads even more than on the more stable, stiffer concrete pavements.

For more information on any of the studies cited in this article, contact the CPAM office.



Heavy trucks burn up to 11% less fuel on concrete pavements than on asphalt pavements

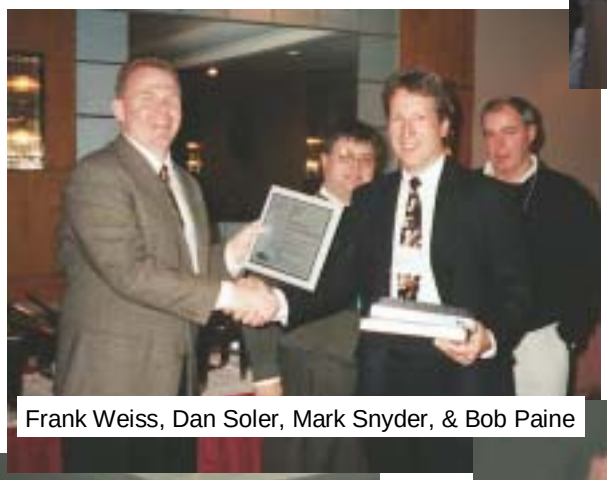
CONCRETE PAVING ASSOCIATION OF MINNESOTA
CPAM

Concrete is better!

We're on the Web!
concreteisbetter.com

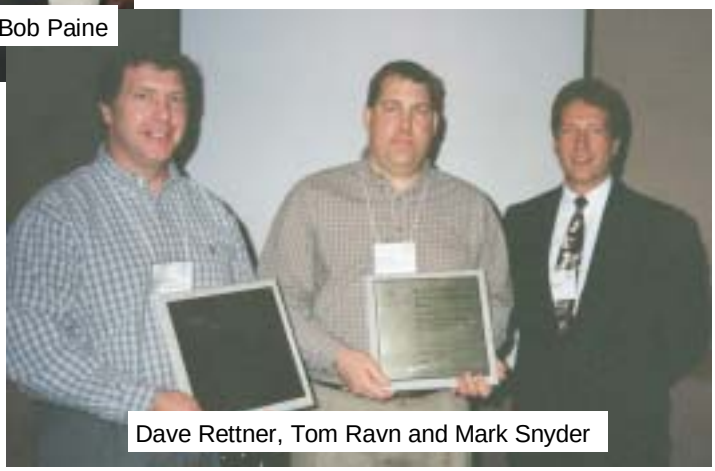

Sarah Stehly and Ken Hoffman

Welcoming in a New President...


Frank Weiss, Dan Soler, Mark Snyder, & Bob Paine

...And Re-presenting awards to the National Award Winners

Congratulations to all!!


Dave Rettner, Tom Ravn and Mark Snyder


Paul Brand

Concrete Paving Association of Minnesota 2002 Annual Meeting

Tech Corner

Frost Heave: How to Identify,

Frost action is best described as the expansion and eventual consolidation of fine-grained soils due to freezing. A number of factors must be present for frost action to occur including:

- A "frost-susceptible" soil (generally a silt or silty clay)
- An adequate supply of moisture (due to infiltration, ground water movement, capillary rise, and others)
- Sustained temperatures below freezing (the soil must freeze - ambient air temperature can be used as a predictor, as can historic climatic data)

Frost heave occurs when adequate moisture is present in a frost susceptible soil that is then frozen. These conditions lead to the formation of "ice lenses" in the soil. Because ice occupies a greater volume than water, a wedging action or expansion of the soil results. As the ice lenses form, additional water is drawn in, leading to further expansion. When the soil thaws, the ice lenses melt and consolidation of the soil occurs.

Frost action affects all pavement types, *although concrete pavements are less susceptible to it than asphalt pavements*. It is most detrimental during the formation of the ice lenses, which result in expansion of the soil. Pavement distress typically involves longitudinal cracking and differential vertical movement of the slabs. The consolidation phase during thawing is not as critical because concrete pavements distribute stresses over a wide area. The most problematic areas are transition zones between materials of different frost susceptibility.

Methods to minimize or eliminate frost action include:

- Removal of the frost-susceptible soil and replacement with a more suitable material
- Cross hauling to eliminate differential frost susceptibility
- Addition of soil modifiers to reduce frost susceptibility
- Minimizing the level of moisture present through proper drainage, pavement maintenance, and design features

For more information on frost action, see ACPA publication TB011P (available from the CPAM office) which covers subgrades and subbases for concrete pavements. You can also contact Mike Ayers at the American Concrete Pavement Association (847-966-2272) or Mark Snyder at the CPAM office for more information or if you have any questions about this article.

(reprinted and modified from the ACPA on-line publication *On The Grade*.)

CPAM Welcomes New Members

The Concrete Paving Association of Minnesota welcomes new member Ruan Transportation Management Systems and invites you to "get to know 'em"!

Ruan Transportation Management Systems provides a service system for bulk transportation, full-service truck leasing, truck and trailer rental, contract maintenance and third party logistic service. Ruan Transport Corporation specializes in the transportation of bulk products and dedicated service. Their terminals serving the Minnesota Market are located in Mason City, Iowa, Fargo, ND and the Twin Cites. We Central dispatch most of the dry bulk equipment from Mason City, Iowa. Their fleet size varies somewhat during the paving season, but averages approximately 50 units during mid-summer. Ruan owns more than 55 portable storage bins for use in road construction.

Ruan's is privately held and is headquartered in Des Moines, Iowa. Their bulk operations are located primarily in the mid-western states where they operate more than 1000 power units and 1500 tanks. Ruan's has established 4 regions nationwide, with the North Central Group managing the fleet for Minnesota.

Ruan's contact information for the CPAM directory follows:

Ruan Transportation Corporation
3200 Ruan Center
Des Moines, IA 50309

Rich Gladish, Area Manager
Bob Hogstad, Regional Manager
Mike Mefford, Director National Accounts
(641) 424-3714

Fax (641) 424-8541
email: rgladish@ruan.com
web: www.ruan.com

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Airport News

Kevin MacDonald of Cemstone lectures Airport Seminar attendees on the finer points of concrete mix design

PCC Airport Pavement Conference A Success!

The 2nd Annual Tri-State Regional Concrete Airport Pavement Technical Conference was held at the Ramada Plaza Suites in Fargo, ND on February 12-13, 2003. The conference was attended by more than 50 consultants, airport managers, contractors and government officials, who heard presentations on a broad range of topics concerning airport pavement type selection, funding mechanisms for airport improvements, design and life-cycle cost analysis, and case studies of concrete pavement rehabilitation and reconstruction at airports around the upper Midwest.

This conference was organized and jointly sponsored by CPAM, the North and South Dakota Chapters of the ACPA, the Minnesota, North Dakota and South Dakota DOT Divisions of Aeronautics, and representatives from SEH Inc., Lafarge North America, and other CPAM/ACPA members. Lafarge North America and the North Dakota Concrete Council also hosted the conference reception. We would like to thank all of the speakers and hosts who helped to make the conference possible, as well as all of the members who contributed door prizes for the event.

Plans will soon begin for the 3rd Annual Conference – tentatively to be held at a location in South Dakota or Minnesota – we hope to see you there!

FAA Says Whitetopping Eligible for Funding

In response to several recent inquiries about airfield whitetopping projects, the American Concrete Pavement Association (ACPA) is distributing an important message to the airfield design and construction community: Whitetopping projects are now and always have been eligible for Federal Aviation Administration (FAA) funding and, if selected, the FAA P-501 concrete pavement specification needs only minor modifications to accommodate the use of whitetopping.

The FAA's official position on whitetopping has been in print for many years. Paragraph 410 of the FAA Advisory Circular on Airport Pavement Design (AC 150/5320-6D) includes concrete overlay of flexible pavement (e.g., conventional whitetopping) as a viable pavement design option. The Advisory Circular even provides thickness design curves for determining the whitetopping thickness.

The concrete pavement designer, specifier and constructor need to be aware of certain aspects of whitetopping design and construction that differ from new pavement, and the FAA P-501 Specification needs minor modifications to work well with whitetopping. Changes should be made in the measurement and acceptance criteria, and the changes should address thickness variability and material quantities. Concerns about thickness can be resolved by milling the existing asphalt to a uniform profile, although this step adds cost and is not necessary. The specifications in most whitetopping projects are modified to address the thickness variability (due to irregularities in the existing asphalt surfacing) and to allow the acceptance of concrete by the cubic yard with a unit cost for placement by the square yard.

Airport operators who want the low-maintenance, high visibility, all-weather, fuel-resistant benefits of concrete airfield pavements have another option besides reconstruction!

For more information, contact Jim Lafrenz, ACPA Director of Airports, at 202-842-1010.

Why Concrete Is Better: Reason #14.

The Southwest Airlines flight attendant came on the intercom after a particularly hard landing and said:

"That was quite a bump, and I know what y'all are thinking. But I'm here to tell you: it wasn't the airline's fault, it wasn't the pilot's fault, it wasn't the flight attendant's fault ... it was the asphalt!"

Concrete vs. Asphalt – Which is Easier?

by Matt Zeller, Director of Engineering Services

People have said for years that concrete is a hard material to use. The truth is, concrete is very, very easy to use!

Let's see … cement, durable rock and sand, and water … that's all it takes to make concrete! Always has been, always will be (at least as far into the future as I can see). Oh yeah, a couple ounces of magic elixir (air entraining and water reducing admixtures) have been added in recent years to help ensure the durability of the concrete, but the main components haven't changed much over the last hundred years or so.

Back in the good ol' days, concrete was proportioned using the "scientific formula" of 3:2:1. That's three parts rock, two parts sand, and one part cement. Whether it was shovels or buckets, 3:2:1 worked pretty well in most cases. Many concrete pavements constructed using this mix design are still in service today. Over the years, we graduated to using scales and, more recently, load cells to verify that the mix design was being followed. But in the end, we still use cement, rock, sand and water in about the same proportions as before.

Until the recent past and the inception of contractor quality control, Mn/DOT used a canned mix for the entire state: 530 pounds of cementitious material (450 lbs cement and 80 lbs fly ash), 244 pounds water, 1200 pounds sand, and enough rock to round out the cubic yard (usually around 1800 pounds). If the mix was not workable enough, a few pounds of cement and water were added to allow easy placement and finishing of the mix.

Today's specifications require the contractor to design the mix with a maximum water-cement ratio of 0.40, and a typical mix now consists of about 575 pounds of cementitious material, 220 pounds of water, 1150 pounds of sand, and 1800 pounds of rock. Same raw materials, same general recipe. No new binders every year, no temperature-dependent material behavior, no traffic dependency. Just plain concrete, period!

The most common alternative paving material has been subjected to a number of changes in the past few years to try to improve its durability and performance potential. Which is a good idea. Almost any time a consumer product can be improved it is a good idea. But keeping all of these improvements straight and tracking their performance can be a problem.

2331, 2341, 2351, 2361, LV, MV, HV, SP are all recent Mn/DOT asphalt paving specifications. Most are still in use and some have sub-divisions within the specification. Many of the specifications also require the use of different asphalt binders for different temperature conditions. It would probably require a math major to set up the matrix with all the variables to determine the number of possible mixes available to use, let alone to figure out which one is best for a given situation!

And some people think concrete is difficult to work with!

And then there is the issue of pavement maintenance … most folks seem to think that asphalt is easier to maintain than concrete. But is it?

Take a utility repair, for instance. Both types of pavement will require removing the pavement for access. After the utility work is completed, the story changes. Asphalt surfacing requires that the base be replaced, then a load of hot mix is dumped in and spread, and lastly rolled. Voila! All done! It's easy! No problem! Except that the backfill base material probably was not designed to carry the required loads, the compaction of the utility trench may be questionable, the compaction of the base may be questionable, and even the compaction of the hot mix may be questionable (especially at the perimeter of the repair). After the patch is completed and everything looks hunky dory for awhile, the settlement eventually begins, along with the perpetual maintenance. The higher costs of maintaining asphalt pavements are well documented.

Concrete, on the other hand requires that the base be replaced as before. Reinforcing steel (tie bars or dowels) is usually drilled and grouted into the existing concrete to tie the patch into the existing concrete, thereby ensuring little settlement. A ready mix truck delivers some concrete, which is placed, consolidated, finished and cured. The edges of the existing pavement are the forms for the new pavement, ensuring a level patch. Even if the utility trench and base compaction are questionable, the steel ties and rigidity of the concrete transfer some of the load to the adjacent panels and spread the load, thereby reducing the stresses at the bottom of the concrete.

And the whole process can be done in a matter of hours. Many of today's concrete mixes can (with proper construction techniques) be opened to traffic in 4-8 hours, allowing repairs to be done between the morning and evening rush hours or during the overnight period.

No expensive rollers or other equipment were required. No outside crews were required. The only thing needed was a little understanding of how to properly place, finish and cure concrete.

Most folks wouldn't consider it a big deal to place a concrete sidewalk or some steps. Using concrete for pavement repairs isn't a big deal either.

Hmmm, maybe concrete's not the more difficult repair after all!

(For more technical information on concrete pavement repair techniques and performance, contact the CPAM office!)

Matt Zeller, Director of Engineering Services

Count on Concrete

Concrete Paving Association of MN
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Mark your calendars for these up and coming events!

Calendar of Events

Local Events:

Feb 27	5th Annual MN Trans Alliance Drive-In	Kelly Inn, St. Paul
Mar 6	AGC Construction Safety Day	MPLS Convention Center
Mar 11	**CPAM Board of Directors Meeting**	**Breezy Point Resort**
Mar 12	CTS Transportation Career Expo	Radisson Metrodome, MPLS
Mar 12-13	**42nd Annual Concrete Paving Seminar**	**Breezy Point Resort**
Mar 25	Airport Tech Assistance Program	Aitkin Airport
Apr 1	Airport Tech Assistance Program	Faribault Airport
Apr 22-23	MN Spring Maintenance Expo	St. Cloud
Apr 29-30	CTS Transportation Research Conf	RiverCentre, St. Paul
May 7-9	MPWA Spring Conference	Grand View Lodge, Brainerd

National Events:

Feb 25-27	ACPA Airport Pavement Design Seminar	Skokie, IL
Mar 3	ACPA Airport Subcommittee Meeting	Williamsburg, VA
Mar 26-27	ACPA SLR Subcommittee Meeting	Scottsdale, AZ
Apr 22-24	ACPA Concrete Pavements 101 Course	Skokie, IL
Apr 27-30	Int'l Center for Agg Res. Ann. Symposium	Austin, TX
May 13-14	Government Affairs Conference	Washington, DC
May 21-23	ACPA Highway Summit and Subcom.	Denver, CO
Jun 4-5	ACPA SLR Summit on Measurement	Chicago, IL
Jun 10-12	ACPA Professor's Seminar	Skokie, IL
Jul 14-17	ACPA Mid-Year Committee Mtgs	Chicago, IL

If you have items you'd like to add to the calendar, please contact the CPAM office!

In an effort to deliver this newsletter and future mailings to you promptly, please notify us of any mailing or addressing problems you may have noticed on your mailing label. We have been attempting to update our databases and hope that we have the most current information on file for you or your organization. For any changes please notify Lisa at the CPAM office (763)561-0402.