Subject: Concrete Matters from Southwest Concrete Pavement Association
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SOUTHWEST CONCRETE PAVEMENT ASSOCIATION

Concrete Matters

March 2014

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Welcome to Concrete Matters, the monthly newsletter from the Southwest Concrete Pavement Association. This monthly newsletter contains the latest news and information of interest to the concrete pavement industry in California and Nevada. Please feel free to distribute this newsletter to others who may be interested in long lasting pavements.

The Benefits of Light Colored Paving Materials

Pavements (and other human-made structures) are quite often constructed of heat-absorptive materials which capture and store solar energy only to later release it into the atmosphere. The result is that densely built urban areas see an increase in ambient temperatures relative to the temperatures of rural areas within the same climatic zone. This phenomenon is known as the Urban Heat Island (UHI) effect.

A recent article in the Pavement Preservation Journal, authored by Yetkin Yildirim, director of the Texas Pavement Preservation Center, explores the role that pavement, in particular, plays in UHI. Because pavements cover approximately 35-40 percent of populated areas, they are a major contributor to UHI. "Heat energy," Yildirim notes, "behaves differently depending on the color of the surface that it comes into contact with." Light colored surfaces generally reflect heat energy, while dark ones absorb it. A surface's degree of reflectance is known as its albedo, which is expressed as a numerical value

CONEXPO/CON AGG Update

CONEXPO/CON AGG was a big success.The huge construction equipment show in Las Vegas is co-sponsored by the National Ready Mix Concrete Association (NRMCA).Many California concrete contractors were in attendance to view machinery from Rex-Con, Erie, Guntert & Zimmerman, Surface Systems and Instruments, GOMACO, Allen Engineering, MutiQuip, and even CMI.

Upcoming Events:

March 11: SWCPA Board of Directors Meeting
9:30 a.m. - 1 p.m.
Sacramento, CA

March 12: Caltrans Concrete Pavement Repair Committee Meeting
10 a.m. - 12 p.m.
Translab, Sacramento

March 12: Caltrans/Industry Cast in Place Concrete Meeting
1 - 3 p.m.
Translab, Sacramento

March 13: Nevada DOT Inspector Training Class
7 a.m. - 11 a.m.
Carson City, NV

March 23-27: ACI Spring

between 0 and 1 and represents the percentage of the total light striking a surface that gets reflected. A light colored object has a high albedo - near 1, or 100 percent reflectance; a dark object has a low albedo - closer to 0.

Yildirim's article goes on to explain that asphalt pavement has traditionally been black; the albedo of a freshly installed asphalt pavement is about 0.05, meaning that 95 percent of the sun's energy is being absorbed. Aged asphalt, which has faded to a lighter color, generally has a solar reflectance somewhere between 0.10 and 0.18.

New, cured gray cement concrete pavement, on the other hand, has been shown in field tests to have an albedo in the range of 0.35 - 0.40. As concrete ages, it tends to darken because of dirt and tire wear, so most older concretes have albedos in the range of 0.20 - 0.30. The use of white cements and slag cements can improve upon asphalt to an even greater extent: white cement concrete pavements have albedos in the range of 0.70 - 0.80 when new and 0.40 - 0.60 when aged.

Varying the mix design of portland cement concrete can greatly increase its albedo. Researchers in the Heat Island Group at the Lawrence Berkeley National Laboratory performed experiments using laboratory fabrication and exposure (such as simulated weathering, soiling, and abrasion) of 32 different concrete mixes. Their studies confirmed the benefit of using light-colored aggregates and white cement; however, considering the higher costs associated with these materials, the study also indicated that certain blended cements (slag cements) may perform almost as well as white cement while offering a cost comparable to gray cement. And the cost savings obtained by switching from asphalt pavements to normal gray concrete pavements are incontrovertible: Lawrence Berkeley National Laboratory simulations of the influence of pavement albedo on air temperature demonstrate that high albedo pavements could save a city millions of dollars per year in cooling energy and smog-related medical and lost-work expenses.

"High albedo is yet another benefit of diamond grinding when it is used as part of a complete concrete pavement preservation (CPP) strategy for aging pavements," said John Roberts, executive director of the International Grooving & Grinding Association. "Unlike an asphalt overlay solution, CPP with diamond grinding lightens the pavement surface by removing the weather-worn and soiled surface, increasing the albedo and providing the cost savings and environmental benefits discussed above."

To learn more about diamond grinding and CPP, read the IGGA's Concrete Pavement Surface Restoration Fact Sheet.

References:
1. Levinson, R. and H. Akbari. 2001. "Effects of Composition and Exposure on the Solar Reflectance of Portland Cement Concrete," Lawrence Berkeley National Laboratory Report LBNL-48334, Berkeley, CA. Online at http://www-library.lbl.gov/docs/LBNL/483/34/PDF/LBNL-48334.pdf
2. Pomerantz, M., H. Akbari, A. Chen, H. Taha, and A.H. Rosenfeld. 1997. "Paving Materials for Heat Island Mitigation," Lawrence Berkeley National Laboratory Report LBL-38074, Berkeley, CA.
3. Pomerantz, M., B. Pon, H. Akbari, and S.-C. Chang. 2002. "The Effect of Pavements'Temperatures on Air Temperatures in Large Cities,"" Lawrence Berkeley National Laboratory Report LBNL-43442, Berkeley, CA.

TWO WEEKS AWAY!! ACI Spring 2014 Convention Reno, NV

Convention
Reno, NV
Register here. Agenda and session schedules are now posted online.

April 8-9:
Annual Nevada Transportation Conference
8 - 5 p.m.
Texas Station Hotel/Casino
Las Vegas, NV
Agenda and registration are available here.

April 22-24: Spring 2014 National Concrete Consortium
Crowne Plaza Jacksonville Riverfront
Jacksonville, FL
Click here to register.

On behalf of the American Concrete Institute, the ACI Western Nevada and Northern California Chapter and the SWCPA, you are invited to attend the ACI Spring 2014 Convention, March 23-27, 2014, at the Grand Sierra Resort in Reno, NV.

At the convention, you will have the opportunity to participate in the development of industry codes and standards during over 300 committee meetings; network with many of the world's leading concrete professionals at events such as the Opening Reception, Women in ACI Reception, and Concrete Mixer; and learn about the latest in concrete technology from industry experts while fulfilling your continuing education requirements. Featured presentations include speakers from Caltrans and Nevada DOT in the pavement track.

For more information, click here.

City of Los Angeles Developments

Recent meetings with City officials are pointing to the potential 'Save Our Streets' bond proposal going from $3 billion to $4.5 billion to include sidewalks. In addition, CNCA and SWCPA are coordinating input to an environmental group doing a Cost Benefit Analysis of cool pavements for L.A.

Registration Open for Spring 2014 National Concrete Consortium

The Spring 2014 National Concrete Consortium will be held in Jacksonville, FL on April 22-24 at the Crowne Plaza Jacksonville Riverfront. Click here for the agenda or register online here. Hotel block rooms will be available until Friday, March 28 by using the "National Concrete Consortium" group rate. Click here to reserve your hotel room.

Sincerely,

Craig Hennings
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