



International Society for Concrete Pavements

What's New at ISCP

Welcome From the President

It is with great pleasure that I welcome you to the first volume of the Society's newsletter. This represents a significant milestone in the Society's young history. Established in 1998, the Society has seen significant growth in the number of initiatives to serve the needs of the membership and the concrete pavement community. An excellent website has been developed; the technical journal is beginning to take shape (see related article below); and the planning for the 8th International Conference is in full swing (see related article below). Over the next several months, we will announce several additional initiatives to further serve the needs of the membership.

As with any volunteer technical organization, the success of the organization depends on the time contributed by its members. We have a core group of dedicated members who freely give of their time - the fine newsletter effort by Jake Hiller and Erwin Kohler, the many hours put in by Norb Delatte and his editorial board to develop the journal, the untiring effort of Dan Zollinger and his Conference Steering Committee, and the work done by Mark Snyder in the dual role of Secretary and Treasurer. We can always use additional help and support. If you have the time and feel the urge to serve, please contact Mark, Dan, or me and we will put you to work.

Finally, the Society is financially sound and has a respectable membership. If you are not yet a member but are actively involved in concrete pavements, I urge you to give us a try. The purpose of the Society is to further engineering and technical education, scientific investigation, and research in all areas related to the design, materials, construction, rehabilitation, and management of concrete pavements. The Society's efforts promote technology and technical competence to improve concrete pavement performance and durability in a cost-effective manner.

Shiraz Tayabji, President, ISCP
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International Journal of Concrete Pavements Call for Papers

In an effort to disseminate new information and provide on-going benefits to ISCP members in good standing, the Society is launching a new publication. The *International Journal of Concrete Pavements*, the new peer-reviewed electronic journal of the International Society for Concrete Pavements, invites the submittal of papers for review and possible inclusion in future issues of the Journal. For manuscript guidelines and editorial policies, please go to www.concretepavements.org/Membership/ejournalCFP.htm. Specific questions on the Journal can be directed to Norb Delatte at n.delatte@csuohio.edu.

Updates on the *International Journal of Concrete Pavements* will be available in upcoming ISCP Quarterly E-Newsletters as well as on the [ISCP webpage](#).

ISCP Online Discussion Forums

The International Society for Concrete Pavements has created an online forum for use by members for discussions on all topics related to concrete pavements, materials, and the Society itself. Members are required to apply for an account to gain full access to the message boards. For information on registering a username and password on the web, go to p200.ezboard.com/binternationalsocietyforconcretepavements. Members that have obtained access previously can access the message boards directly [here](#).

Interested in ISCP Membership?

We encourage all of our colleagues to contribute to the further advancement of the concrete pavements and materials professions by joining the International Society for Concrete Pavements. At US\$50/year, individual memberships are relatively inexpensive (and are offset by reduced registration rates at ISCP events). Student membership is only US\$25/year. Members also have online access to discussion forums, subscription to the *International Journal of Concrete Pavements*, and direct emailing of the ISCP Quarterly E-Newsletter among other resources. For more information on membership, contact Mark Snyder (Secretary-Treasurer) at msnyder@concretepavements.org.

Countdown to Colorado

Occasion already passed!

The 8th International Conference on Concrete Pavements is scheduled for August 13-18, 2005 in Colorado Springs, Colorado, USA. The theme of the conference will be *Innovations for Concrete Pavement: Technology Transfer for the Next Generation*. Paper submittals are encouraged from academia,

practitioners, and industry from countries throughout the world. Information on submission guidelines and the conference itself can be found on the ISCP website at <http://www.concretepavements.org/Membership/8thICCP-CFP.htm>.

Important Dates for the 8th International Conference on Concrete Pavements:

September 1, 2004
February 15, 2005
April 1, 2005
May 1, 2005

Letter of Intent Submission (optional)
Completed papers due for review
Review completed, authors notified of final disposition of their papers
Electronic versions of final papers due

Industry Notes

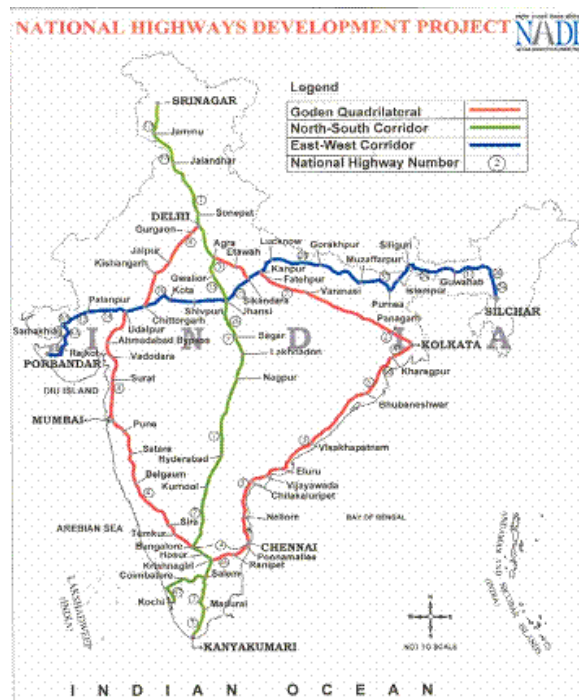
Concrete Highways in India

In October 1998, the Indian Prime Minister presented a program for modernizing National Highways. The \$12 billion, 10-year National Highway Development Plan (NHDP) is India's version of the interstate highway initiative undertaken in the U.S. in the 1950s. It aims to link the country's major cities, ports and regions with more than 8,100 miles of mostly four-lane concrete highways by 2009 and will widen to six

and occasionally eight lanes near some cities.

The works have provided a jump-start to India's cement and steel industries, 4 million tons of cement and 300,000 tons of steel being required annually to support the program. April to September 2002 saw the country's cement sector grow 9.8% and the steel sector 9.3%.

Funded by the World Bank, the Asian Development Bank, and a fuel tax, among other sources, the project's first phase consists of a 3,600-mile "Golden Quadrilateral" running along existing corridors between New Delhi, Calcutta, Madras and Bombay. As of the end of last month, almost 1,900 miles have been completed on that part of the project, as well as almost 400 miles of the 4,500-mile North-South and East-West Corridors.



During June 2004, Dr. Shiraz Tayabji, ISCP President, visited several concrete pavement construction projects in the States of Bihar and Uttar Pradesh. The visits were organized by the World Bank and the National Highway Authority of India. Dr. Tayabji reports that the concrete pavement construction work is being performed using the latest slipform paving equipment and concrete plants. Several international contractors and consultants are working on these projects.



Various sources: World Highway, Routes de Monde v.12 (5):17-18, June 2003

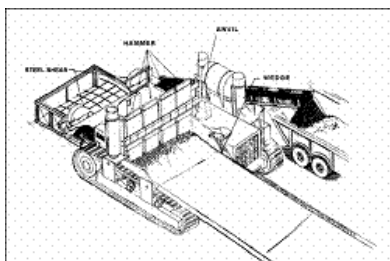
http://www.fisiusa.org/fisi_News_items/Feel_Good/good015.htm and <http://www.nhai.org/>

Concrete Optimization Software Tool (COST)

To help concrete producers and materials engineers create "customized" concrete more efficiently, the Federal Highway Administration (FHWA), with the assistance of the National Institute of Standards and Technology (NIST), embarked on a research project to investigate the feasibility of using statistical experiment design and analysis methods to optimize concrete mixture proportions. The final report from the project, Concrete Mixture Optimization Using Statistical Methods (FHWA-RD 03-060), is available on the Internet at www.tfrc.gov/pavement/pubs/03060/. As part of the project, FHWA and NIST developed an Internet-based software program that illustrates the use of statistical methods to optimize concrete mixtures. Available at ciks.cbt.nist.gov/cost/, the Concrete Optimization Software Tool (COST) uses a six-step interactive procedure to help the user determine the proportions needed to meet specific performance objectives.

Source: Research & Technology Transporter, FHWA, April 2004
<http://www.tfhrc.gov/trnspr/apr04/index.htm#pave2>

Road Recycler



If all goes as planned, the Road Recycler™ will lift a 12-ft wide, foot-deep section of concrete pavement, pulverize the concrete into reusable aggregate, separate and cut the steel rebar, and leave behind a roadway ready for repaving. In a current NCHRP IDEA project, Road Processing Resources, Inc. is developing a hammer and anvil system that reflects energy from the hammer's blows back into the concrete, crumbling it and releasing it from the steel. The rubblized concrete is loaded by conveyor into trucks and the steel is sheared into 3-foot sections and dropped into containers, all in a continuous one-step process. Pneumatic hammers and controls are being designed and tested by two industry partners. Mechanization of the lifting wedge and anvil has been developed in collaboration with an engineering firm. The panel machine, rigged for testing both gravity drop and pneumatic hammers, is now in Minnesota for continued testing and demonstration.

Source: IGNITION MAGAZINE: NEWS FROM TRB'S IDEA PROGRAMS - SPRING/SUMMER 2004, page 7
http://trb.org/publications/ignition/Ignition_6.pdf
 Contact: Deems Pfaff, rpr@colorado.net

Dowel Bar Detector

Measuring the position of dowel or tie bars embedded in concrete has been a difficult and costly task. The concern over the possible problems with dowel bar misalignments is one of the main reasons dowel bar inserters (DBI) are not widely used in the U.S. The article describes the operation, effectiveness, and limitations of a device manufactured in Germany and distributed by ARA, along with field experience detecting dowel bars placed in baskets in a project in Nevada. More information on the dowel bar detector can be found at http://www.eresnet.com/a_mitscan.htm.

Source: Eye on ERES (pdf, page 4)
http://www.eresnet.com/v10_1.pdf
 Contact: Tom Yu, tom.yu@ara.com

Research News

CSIR Transportek researcher win awards at 23rd Annual Southern African Transport Conference

A researcher from CSIR Roads and Transport Technology ([Transportek](#)) walked away with a coveted award at the recent [23rd Southern African Transport Conference](#). Dr. Anna-Carin Brink's paper, entitled *Improvement of Aggregate Interlock Equation Used in Cncpave*, won the award for the best paper presented at the conference. An abstract of Dr. Brink's award winning paper, co-authored with Emile Horak, Bryan Perrie, Pieter Strauss and Alex Visser, is included below.

Abstract: It is by now common knowledge that the old Concrete Pavement Design and Construction Manual (Manual M10, 1995) has been upgraded to a design process based on mechanistic design principles, in the form of a software package, cncPave. The aim of this paper is to present the results of a study, conducted at the University of Pretoria to improve the aggregate interlock equation used in the software, as it was identified that the previous relationship modelling the mechanism of concrete joints in shear (aggregate interlock) was not accurate, especially for the smaller sized coarse aggregates used in the construction of concrete.

A main objective of the study was to investigate existing methods for modelling aggregate interlock shear transfer efficiency and use that as the basis to develop a mechanistic model simulating variations in joint load transfer efficiency with joint opening, load magnitude, subbase characteristics, and concrete aggregate properties. A secondary objective was to investigate the difference in pavement response to static and moving impulse or dynamic loads (equivalent to traffic loads) in terms of deflections across the joint in the pavement.



The specific contribution of the study to the improvement of the aggregate interlock equation used in the new mechanistic concrete pavement design method, cncPave, is highlighted in the paper.

Of the conclusions reached after interpretation of experimental results were that the deflection load transfer efficiency was greater during dynamic than static loading, and that larger maximum sized coarse aggregates in the concrete mix (37.5 mm) had lower deflections at the same crack width than smaller sized coarse aggregates (19 mm).

Source: http://www.csir.co.za/plsql/ptl0002/PTL0002_PGE038_ARTICLE?ARTICLE_NO=7199571

Mobile Concrete Lab to Go Cross Country

Iowa State University's newest laboratory doesn't have an address. You won't find it on a map. But you might see it rolling down the highway in Texas, New York, or North Dakota.

Representatives from Iowa State University, the Iowa Department of Transportation, and the concrete paving industry gathered for the Mobile Concrete Research Lab grand opening and ribbon cutting on July 6, 2004, at Iowa State's Center for Transportation Research and Education.

Within days, the mobile lab will pull out of campus and head out across the country to conduct research at construction sites in 16 states that have agreed to partner with Iowa State's Center for Portland Cement Concrete Pavement Technology (PCC Center). The mobile lab's advanced research capabilities are expected to lead to many benefits for all stakeholders involved and ultimately the traveling public.



The lab will lead to critical advancements and improved practices for the concrete paving industry. "This is a door opener to the future," explained Gerald Voigt, Senior Vice President and Chief Operations Officer of American Concrete Pavement Association (ACPA). The Federal Highway Administration (FHWA) and state departments of transportation (DOTs) also expect

to benefit from the lab's research. As stated by John Adam, director of the Iowa DOT Statewide Operations Bureau, the mobile lab will conduct research that, "doesn't just sit on the shelf, but that delivers results."

The mobile lab is fully outfitted with a comprehensive range of high-tech equipment. Some of the equipment had to be custom built or modified to provide optimum results in the mobile lab's unusual lab-in-the-field environment.

One such example is the onboard air void analyzer (AVA). The AVA measures the volume and size distribution of tiny air bubbles whose presence and proper position are critical for concrete roads subject to freeze-thaw cycles. Because any vibration, such as that caused by wind, can dramatically skew the AVA's results, the trailer was designed with a trapdoor in the floor to accommodate the AVA. When the lab is parked, the base of the AVA will rest on the ground through the hole so that it is protected by the trailer but not touching the trailer.

Funding for the mobile lab was made possible through a unique partnership between the ACPA, state paving associations, and Iowa State University. The mobile lab will be used to conduct research sponsored by the FHWA, numerous state DOTs, and industry. This partnership is an innovative model for working across traditional sectors to achieve goals that benefit all involved.

More information on the mobile concrete laboratory and the Center for Portland Cement Concrete Pavement Technology can be found on the web at www.pcccenter.iastate.edu.

Source: http://www.pcccenter.iastate.edu/whatsnew/mobilelab_cross_country.cfm

Heavy Vehicle Simulator Testing Conducted in Palmdale, California



As part of the Caltrans Long Life Pavement Rehabilitation Strategies LLPRS, a fast setting strength hydraulic cement concrete (FSHCC)/Type I/II Portland cement concrete PCC blend was evaluated under Heavy Vehicle Simulator (HVS) tests.

Because it is expected to be used on projects where heavy trucks are expected to be allowed on the slabs within 4 to 8 hours after placement, this newly placed concrete is specified to obtain a flexural strength of 2.8 MPa within 4 to 8

hours of placement.

Two full-scale test sites, each approximately 210 m in length, were constructed using this concrete on either side of State Route 14 about 5 miles south of Palmdale, California. Various test sections were constructed at these two sites. The site in the southbound direction (South Tangent) included sections with different thicknesses of concrete placed on compacted granular base. The site in the northbound direction (North Tangent) included 200-mm concrete on cement treated base, with various design features including dowels, tied shoulders, and widened lanes.

The main objective of the series of tests on the South Tangent was to evaluate the fatigue behavior of the fast setting hydraulic cement concrete/Portland cement concrete blend under the influence of accelerated wheel loads. It was assumed that the behavior of this mix is similar to that of a pure FSHCC mix.

This [report](#) summarizes the results and observations of all HVS tests conducted on the South Tangent. Included in this [report](#) are all test sections on the plain jointed (no-dowels, no-tie bars, standard lane width) sections with concrete thicknesses of 100 mm, 150 mm, and 200 mm. Analysis of the North Tangent sections is currently being conducted.

More information on this project and others in California as well as information on research program at the Pavement Research Center can be found at www.its.berkeley.edu/pavementresearch.

Source: <http://www.its.berkeley.edu/pavementresearch/PDF/Palmdale%20South%20Tangent.pdf>

Featured Thesis Abstract

Every issue, the ISCP Quarterly E-Newsletter would like to feature a recent thesis or dissertation relating to concrete pavements and materials from around the world. Interested individuals should submit their abstract, former university affiliation/advisor, and current position information to newsletter@concretepavements.org. This quarter, we have two featured abstracts. The first is from Dr. Elin Jensen followed by an abstract from Dr. Julie Vandenbossche.

Investigation of Cracking Process and Aggregate Interlock Properties of JPCP Cracks

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Ph.D. in Civil and Environmental Engineering at the University of Michigan (2002)

Thesis Advisor: Professor Will Hansen

The main objectives of this research are to investigate the cracking process of jointed plain concrete pavements (JPCP) and to investigate the shear load transfer through aggregate interlock of fully developed transverse cracks. A predictive model for JPCP in-plane tensile strength was developed based on computed maximum load for a JPCP slab described by the bilinear stress-crack width relationship of the concrete. The numerical computed tensile strength of slabs containing partial-depth surface cracks showed that the predicted maximum load is dominated by the first part of the stress-crack width relationship and that the concrete appears to be indistinguishable from a material with a linear relationship when excluding the tail end. The proposed model incorporates these phenomena and excellent agreement was obtained between predicted and measured slab strengths for JPCP concrete mixes described by different stress-crack width relationships. The proposed model can be used in the development of fracture analysis of midslab fatigue cracking of JPCP, where cracking is a key measure of concrete pavement performance as the deterioration of a fully developed transverse crack often accelerates roughness through spalling and faulting.

Depending on the aggregate interlock properties, repeated truck traffic may result in shattered slabs that require replacement. A new simple aggregate interlock model is also proposed that incorporates the principal mechanisms of shear load transfer through aggregate interlock, namely the initial free slip and sliding during wheel (service) loading for different crack widths. The model captures the highly nonlinear shear behavior of JPCP cracks. The model was developed based on extensive laboratory testing of large-scale slabs on full-depth foundations, and model was optimized from laboratory measured slab deflection basins and excellent reproducibility was achieved between experimental and numerical predicted slab deflection basins. The model was calibrated from results of five concrete mixes described with different aggregate interlock properties. The model was verified with results from a duplicate slab and excellent predictions were attained. The proposed aggregate interlock model can be incorporated in numerical pavement analysis tools to predict the added tensile stresses in a JPCP slab due to the nonlinear aggregate interlock behavior.

Interpreting Falling Weight Deflectometer Results for Curled and Warped Portland Cement Concrete Pavements

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Thesis Advisor: Professor Mark B. Snyder

Falling Weight Deflectometer (FWD) test results of concrete pavements are influenced by the presence of temperature and moisture gradients in the pavement. When the pavement surface is warmer and/or has a higher moisture content than the bottom of the pavement, the slab corners tend to curl or warp downward,

exaggerating the level of support present at the corners and sometimes leaving the center of the slab unsupported. If the pavement surface is cooler and/or drier than the bottom of the pavement, the corners of the slab tend to curl or warp upward, resulting in a loss of support at the corners and edges of the pavement. Performing FWD testing at times when pavement support varies due to the presence of temperature and/or moisture gradients results in the measurement of nonrepresentative deflections and can lead to inaccurate evaluations of material properties and pavement conditions. A study was performed to quantify the effects of curling and warping on FWD-based evaluations of concrete pavements and to develop techniques for compensating for the effects of temperature and moisture gradients in the analysis of FWD data. Deflection, strain, temperature, moisture and surface profile data were collected from the concrete pavement test sections at the Minnesota Road Research Facility (Mn/ROAD). Data were collected throughout 24-hour periods at different times of the year so conditions representing various thermal and moisture gradients could be included in the study. The measured slab responses were compared to analytical results generated using the pavement finite element analysis program ISLAB2000. The field data were used to generate models for predicting slab curvature, slab movement at the corners and a correction parameter used for interpreting FWD data when identify voids under the slab.

Upcoming Events

AASHTO 2004 Annual Meeting

September 16-21, 2004 in Philadelphia, Pennsylvania, USA

<http://transportation1.org/calendar/annual2004/>

2nd International Conference on Accelerated Pavement Testing

September 26-29, 2004 in Minneapolis, Minnesota, USA

http://www.cce.umn.edu/engineering/accelerated_pavement

ACPA Airport Pavement Design Seminar

October 5-7, 2004 in Skokie, Illinois, USA

<http://www.pavement.com/Activities/Education/AptDesign.html>

Cement-Base Applications for Pavements

October 5, 2004 in Lakeland, Florida, USA

October 7, 2004 in Panama City, Florida, USA

<http://www.t2.ce.ufl.edu/workshops.asp?workshop=Concrete>

6th International Conference on Managing Pavements

October 19-24, 2004 in Brisbane, Queensland, Australia

<http://www.ozaccomm.com.au/icmp6/>

ACI Fall Convention

October 24 - 28, 2004 in San Francisco, California, USA

<http://www.concrete.org/convention/fall-convention/front.asp>

ACPA Concrete Pavements 101

November 2-4 in Phoenix, Arizona, USA

<http://www.pavement.com/Activities/Education/CP101.html>

Roller-Compacted Concrete Pavement: Design and Construction

November 18, 2004 in Atlanta, Georgia, USA

http://www.secement.org/rcc_seminar_registration.htm

ACPA's 41st Annual Convention

November 30-December 3 in Marco Island, Florida, USA

<http://www.pavement.com/activities/convention/2004/main.html>

84th Annual TRB Meeting

January 9-13, 2005 in Washington, D.C., USA

<http://www4.trb.org/trb/annual.nsf>

World of Concrete

January 18-21, 2005 in Las Vegas, Nevada, USA

http://www.worldofconcrete.com/content/splash_woc.htm

XV Colombian Symposium about Pavement Engineering

March 9-13, 2005 in Melgar, Columbia

<http://fing.javeriana.edu.co/xvsimposiopavimentos/>

CONEXPO-CON/AGG 2005

March 15-19, 2005 in Las Vegas, Nevada, USA

<http://www.conexpoconagg.com>

International Conference on Best Practices for Ultrathin and Thin Whitetoppings

April 13-15, 2005 in Denver, Colorado, USA

<http://www.concretepavements.org/Membership/Whitetopping%20Conference.pdf>

1st European Airport Pavement Workshop

May 11-12, 2005 in Amsterdam, Netherlands

http://www.crow.nl/engels/Other_products/Content/Events/Airport_Pavement.html

7th International Conference on the Bearing Capacity of Roads, Railways and Airfields

June 27-29, 2005 in Trondheim, Norway

<http://www.bcra05.no/>

International Conference on Concrete Repair, Rehabilitation, and Retrofitting

November 21-23, 2005 in Cape Town, South Africa

<http://www.civil.uct.ac.za/icrrr/>

If you wish to submit an upcoming conference, meeting, or call for papers for the next ISCP quarterly newsletter (December 2004), please contact us at newsletter@concretepavements.org.

The ISCP Quarterly Newsletter is edited and maintained by Jacob Hiller and Erwin Kohler. Any suggestions or additions to future newsletters are welcomed at newsletter@concretepavements.org.

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