

The ISAP Reporter

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Editor: Prithvi (Ken) Kandhal



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ISAP'S INTERNATIONAL SYMPOSIUM ON LONG LASTING ASPHALT PAVEMENTS: AN OUTSTANDING SUCCESS

The International Society for Asphalt Pavements' (ISAP) international symposium on **Design and Construction of Long Lasting Asphalt Pavements** was held on June 7-9, 2004 in Auburn, Alabama, USA. The National Center for Asphalt Technology (NCAT) hosted this event. The symposium was also sponsored by the U.S. Department of Transportation (Federal Highway Administration), the Alabama Department of Transportation, Asphalt Pavement Alliance, and the National Asphalt Pavement Association.

The venue of the international symposium was The Lodge and Conference Center at Grand National Golf Course in the Auburn/Opelika area, set in the serene countryside of east Alabama.

Over 35 very good technical papers from many countries concerning long lasting asphalt pavements were presented in three days at the symposium.

The symposium was attended by about 220 people with delegates from twelve countries be-

sides the United States: Australia, Belgium, Brazil, Canada, China, Denmark, India, Korea, Netherlands, Sweden, Switzerland, and United Kingdom.

Professor Carl Monismith, an international leader in pavement design and analysis, was the keynote speaker at the symposium. His presentation provided insight into material selection, structural design, and construction methods for long

(continued on page 2)



Professor Carl Monismith, University of California at Berkley, was the keynote speaker at the symposium

—International Symposium

(continued from page 1)

lasting pavements.

The following papers concerning different aspects of long lasting asphalt pavements were presented at the symposium.

Long Lasting Asphalt Pavements Program

- The Federal Highway Administration's Long Life Pavement Technology Program

Concepts for Long Lasting Pavements

- A New Canadian Initiative to Develop a Long Term Program of Pavement Research
- The European Approach to Long Lasting Pavements - A State of the Art review by ELLPAG
- Making Best Use of Long Life Pavements in Europe
- The Technical and Economic Feasibility of Long-Life Wearing Courses



Professors Ralph Haas (left) and Jon Epps having discussion during the break

- Making Best Use of Long Life Pavements in Europe

Pavement Design

- Foundation Requirements for Perpetual Pavements
- The Effect of Load Spectra and Variability on Perpetual Pavement Design
- Some Suggestions to Improve the Mechanistic Empirical Bituminous Pavement Design

in Indian Context

- Comparison of Design Pavement Methods in France and Quebec
- Long Life AC Pavements: A Discussion of Design and Construction Criteria based on California Experience
- Design Principles of Long Lasting HMA Pavements

Materials and Mix Testing

- Stone Skeleton Asphalt Mixes for High Performance
- An Integrated Approach to Avoid Asphalt Moisture Damage
- Effect of Hydrated Lime on the Rheological Properties of Compatible and Incompatible Asphalts After Long-Term Oxidative Aging
- Imaging Based Evaluation of Coarse Aggregate Used In the NCAT Test Track Asphalt Mixes
- Open Graded HMAC Considering the Stone on Stone Contact
- Laboratory Study of Fatigue Characteristics of Asphalt Surface Mixtures Containing RAP
- A Rapid Performance Test for Superpave Mixtures
- Prediction of Flow Rutting
- Design of 4.75 mm NMA Mixes for Thin Maintenance Treatments
- Fatigue Considerations in the Design of Long-Lasting Pavements
- Determination of Threshold Strain Level for Fatigue Endurance Limit in Asphalt Mixtures



Participants from twelve countries besides the U.S. registered at the symposium

- MDV9 Method for Aggregate Polish Resistance Determination

Accelerated Loading

- Comparison of Rutting Behavior on Test Sections and a Circular Test Track Using a Model Mobile Load Simulator
- Hot-Mix Asphalt Analysis Using Accelerated Testing

Warranties

- European Asphalt Pavement Warranties

Construction

- Evaluation of Segregation of Expressway Asphalt Pavement
- A Construction Planning and Evaluation Tool for Urban Freeway Rehabilitation Projects
- Importance of a Good Quality Control Program in the Performance of HMA Pavements Case Studies



Active participation by the audience at the symposium

- Performance of a Long Life Overlay on a “Perpetual Pavement” Infrastructure Project
- The I-710 Freeway Rehabilitation Project: Mix and Structural Section Design, Construction Specifications, and Lessons Learned
- Long Lasting Low Volume Pavements in Washington State
- Kansas Turnpike - An Ex-

tact Carol Mims at <taplecp@eng.auburn.edu> to obtain the proceedings.

Exhibit booths were set up by the vendors of materials and equipment. The delegates were given a tour of NCAT laboratories and the Test Track. Guests of the delegates were entertained with tours to the Jules Collin Smith Art Mu-



A view of exhibit area at the symposium



Prof. Gene Skok (second from right), ISAP Executive Manager, has good company

seum, Callaway Gardens, and Roosevelt Little White House.

Thanks to the papers, the local organizers, the support of the ISAP Board, and the delegates, the ISAP’s International Symposium on Long Lasting Asphalt Pavements was an outstanding success!



Symposium delegates were given a tour of NCAT laboratories

ample of Long Lasting Asphalt Pavement

- Performance and Rehabilitation of Heavy-Duty Pavements in the UK: Some Case Studies
- Performance of A Long-Life Overlay on a “Perpetual Pavement” Infrastructure Project
- Performance of Flexible Pavements in South Brazil
- A Case Study of Three Full-Depth HMA Interstate Pavements
- Long Lasting Asphalt Pavements - The Danish Experience

A bound volume of the proceedings, titled “International Symposium on Design and Construction of Long Lasting Asphalt Pavements,” June 7-9, 2004, is available from the National Center for Asphalt Technology, Auburn University. Con-



Guests of the delegates at the symposium



Delegates enjoying lunch outside with the serene countryside in the background

SOME OF THE SPEAKERS FROM THE SYMPOSIUM



Hans Ertman Larsen, Denmark



Safwat Said, Sweden



Michael Nunn, U.K.



Mikael Thau, Denmark



Manfred Partl, Switzerland



Rita Fortes, Brazil



Ralph Haas, Canada



Stephen Brown, U.K.



Ian Rickards, Australia



ISAP CHAIRMAN'S REPORT

As I approach the end of my term as the Chair of ISAP, I want to express my deep appreciation for those who really keep the organization going – the staff. They are the asphalt binder for the international mix represented by the membership.

Their dedication to the field of asphalt pavements and especially to ISAP goes largely unnoticed until someone has a problem with the web site or a membership question arises or something inadvertently gets left out of the newsletter. Only rarely do they get thanks or recognition for the outstanding job they perform on behalf of the membership.

The venerable and ubiquitous Gene Skok tops the list as our hardworking Executive Director. Gene is in charge of operations and keeps up with the day-to-day business of communications between the staff and the board of directors. He is a great friend to all in the industry. He constantly seeks out those who may be new to the organization and genuinely encourages their participation. We would all do well to use Gene as a role model.

Eileen Soler takes care of the administrative issues concerning communications, bookkeeping, and record keeping. Eileen's cheerful personality and can-do spirit inspires confidence that the organization is running well. It should be noted that Eileen has taken it upon herself to modernize the operations of ISAP, and she has done this with great efficiency.



*David Newcomb,
ISAP Chairman*

Prithvi (Ken) Kandhal is the editor of this newsletter you are reading. His job is not an easy one in terms of sorting through information coming from the four corners of the earth and conveying it to the membership. Since Ken has assumed the editor's role, we have received numerous compliments on the quality of our newsletter. He has truly turned it into a world-class publication.

Gerhard Kennepohl is our web wizard. He has kept the ISAP web site well organized and fo-

cussed on useful information. The thousands of downloads we have had of the Distinguished Lecturer Series speaks for itself. People navigating the site find it easy to use and informative. Gerhard's enthusiasm and innovation are infectious qualities he passes on to those around him.

One other person I will add to this appreciation list is Carol Tapley of the National Center for Asphalt Technology. While not a regular ISAP staff member, Carol worked tirelessly to arrange and run the first ISAP Specialty Conference this year in Auburn, Alabama. "The International Symposium on Design and Construction of Long-Lasting Asphalt Pavements" was a rousing success because of Carol's careful organization and care.

As we look forward to the 10th International Conference on Asphalt Pavements in Quebec in 2006, I ask that you take a minute to reflect on the service these dedicated people provide for your organization, and that you thank them the next time you see them for all that they do. They most certainly have my sincere gratitude.

ISAP'S TENTH INTERNATIONAL CONFERENCE ON ASPHALT PAVEMENTS

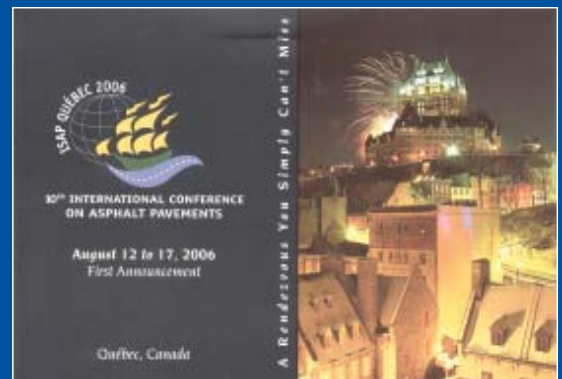
The International Society for Asphalt Pavements' (ISAP) Tenth International Conference on Asphalt Pavements will be held in Quebec, Canada on August 12-17, 2006. The conference will be hosted by Université Laval and the Ministère des Transports du Québec.

The themes for this conference have been selected to reflect recent developments in asphalt pavement technology and to be of interest to researchers and practitioners. All categories of pavements will be considered, including regional and

national freeways, arterials, collectors and municipal, as well as local roads and airfields. Papers dealing with the state-of-the-art, state of the practice, and case studies are expected to be included in the program.

Second announcement and call for papers will be issued in January 2005. For further information on this conference, please visit the website at: <www.icap2006.fsg.ulaval.ca> or write to

<icap2006@agoracom.qc.ca>.



NEWS FROM NORTH AMERICA

The following publications are now available from the Transportation Research Board (www.trb.org):

- **ACCELERATED LABORATORY RUTTING TESTS: EVALUATION OF THE ASPHALT PAVEMENT ANALYZER** (NCHRP Report 508)

This NCHRP report presents the findings of a research project to determine the suitability of the Asphalt Pavement Analyzer, a loaded-wheel tester, as a general method of predicting rutting potential and for use in field quality control and quality acceptance operations. Obtain more details at http://gulliver.trb.org/news/blurb_detail.asp?id=2169.

- **LTPP DATA ANALYSIS: DAILY AND SEASONAL VARIATIONS IN INSITU MATERIAL PROPERTIES** (NCHRP Web Report 60)

This NCHRP Web Report includes a data set that can be used to investigate daily and seasonal changes in pavement material properties as they relate to changes in structural capacity that would necessitate load restrictions. Obtain more details at http://gulliver.trb.org/news/blurb_detail.asp?id=2179.

- **BITUMINOUS BINDERS 2003** (Transportation Research Record 1829)

This Transportation Research Record assesses the effects of styrene butadiene styrene modification on the cracking resistance and healing characteristics of coarse-graded Superpave mixtures; reviews whether asphalt mixtures correlate better

with mastics or binders in evaluating permanent deformation; and examines the possibility of using commercial rheometers for comprehensive testing of asphalt binders, asphalt mastics, and hot-mix asphalts. More details are available at http://gulliver.trb.org/news/blurb_detail.asp?id=2148.

- **QUALITY CHARACTERISTICS AND TEST METHODS FOR USE IN PERFORMANCE-RELATED SPECIFICATIONS OF HOT MIX ASPHALT PAVEMENTS** (NCHRP Research Results Digest 291)

This digest based on NCHRP Project 9-15 provides recommendations for simple, practical, and rapid test methods to measure quality characteristics of as-produced and as-constructed hot mix asphalt. More details are available at http://gulliver.trb.org/news/blurb_detail.asp?id=4115.

- **AN INVESTIGATION OF THE CAUSE OF VARIATION IN HMA BULK SPECIFIC GRAVITY TEST RESULTS USING NON-ABSORPTIVE AGGREGATES** (NCHRP Web Document 66)

This web document investigates the cause of variation in HMA bulk specific gravity test results. See more details at http://gulliver.trb.org/news/blurb_detail.asp?id=4168.

- **MECHANISTIC-EMPIRICAL DESIGN GUIDE AND SOFTWARE NOW AVAILABLE IN A RESEARCH VERSION**

A research version of the National Cooperative Highway Research Program-developed Mechanistic-Empirical (M-E) Design and Analysis Guide and

accompanying software is now available at the Mechanistic-Empirical Design Guide website. The guide and software are being made available to allow for independent testing and evaluation by interested users in the public and private sectors. The M-E pavement design guide uses mechanistic-empirical models to analyze input data for traffic, climate, materials, and proposed structure in order to estimate pavement service life damage. This release is part of the evaluation and education process designed by the American Association of State Highway and Transportation Officials' (AASHTO's) Joint Task Force on Pavements to assist in preparing for approval of a provisional or interim mechanistic-empirical design guide as a future edition of the AASHTO design guide. See http://gulliver.trb.org/news/blurb_detail.asp?id=3953 for additional details.

- **EFFECTS OF SUBSURFACE DRAINAGE ON PERFORMANCE OF ASPHALT AND CONCRETE PAVEMENTS** (NCHRP Report 499)

This report evaluates the effects of subsurface drainage features on the performance of pavements through a comprehensive analysis of data available through June 2001 from the Long-Term Pavement Performance experiments.

- **NEW SIMPLE PERFORMANCE TESTS FOR ASPHALT MIXES** (TRB Circular Number E-C068, September 2004)

This circular, which can be viewed at <http://gulliver.trb.org/publications/circulars/ec068.pdf>, presents five tech-

nical papers on the subject including dynamic creep tests, field shear test, and hollow cylinder tensile test.

• **ILLUMINATION GUIDELINES FOR NIGHTTIME HIGHWAY WORK** (NCHRP Report 498)

This report provides guidelines for illumination for nighttime highway work, work zone illumination design, and use of temporary roadway lighting for construction and maintenance work. This report may be viewed or purchased at <http://gulliver.trb.org/news/blurb_detail.asp?id=2316>.

• **ACCELERATED PAVEMENT TESTING: DATA GUIDELINES** (NCHRP Report 512)

This report is designed to assist agencies involved in accelerated pavement testing (APT) by ensuring proper interpretation of the data and facilitating their use by other agencies. Information in this report is designed to help promote compatibility of data resulting from APT at different facilities and may provide an effective means for economically addressing issues of common concern, reducing duplication of research efforts, and enhancing the benefits of APT.

• **MOISTURE SENSITIVITY OF ASPHALT PAVEMENTS**

This TRB report documents the work accomplished during the national seminar held in San Diego, California, on February 4-6, 2003. The proceedings identify best practices, gaps in knowledge, and research needs on moisture damage in asphalt pavements. The topics addressed in the report include

the following:

- Problem identification – distinguishing between materials-induced and construction-related factors,
- Fundamental concepts – binder and aggregate considerations and failure mechanisms,
- Test methods – laboratory and field,
- Remediation – additives and construction practices,
- Field performance and case studies,
- Specifications – shortcomings and need for improvements, and
- Environmental and health issues.

In addition to the papers and breakout session summaries, the proceedings include questions raised and answers given by some of the more than 100 people who participated in the national seminar.

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The National Asphalt Pavement Association (NAPA) has published Porous Asphalt Pavements (IS-131) which is a useful publication for those who are in the business of designing, consulting, or constructing pavements. Porous pavements are becoming increasingly popular, especially for those dealing with land development issues. With the proper design and installation, porous asphalt can provide cost-effective, attractive parking lots with a life span of 20 years or more. At the same time, porous asphalt can provide storm water management systems that promote infiltration, improve water quality, and eliminate the need for a detention basin.

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The Federal Highway Administration (FHWA) has published the following guide and technical advisory:

• **Roundabouts** - Roundabouts are circular intersections that require entering vehicles to yield to existing traffic in the roadway—eliminate some of the conflict traffic, such as vehicles making left turns, that can cause crashes at traditional intersections. A study by the Maryland State Highway Administration found that installing single-lane roundabouts at 15 intersections resulted in a 100 percent decrease in the fatal crash rate and an 82 percent drop in the total crash rate. For more information on roundabouts, FHWA has developed a handbook for highway agencies, Roundabouts: An Informational Guide (FHWA-RD-00-067), which can be downloaded from <www.tfhr.gov/safety/0068.htm>.

• **Rumble strips** - Rumble strips are grooved indentations in the roadway that provide an audible warning and a physical vibration to alert drivers in danger of veering off the road—help reduce roadway departure crashes, which accounted for 55 percent of all roadway fatalities in 2001. A study found that installing rumble strips on the New York State Thruway reduced run-off-the-road crashes by 88 percent between 1993 and 1997. Rumble strips are inexpensive, can be milled in new or existing pavement, and require little maintenance. An FHWA technical advisory, Roadway Shoulder Rumble Strips, is available at <www.fhwa.dot.gov/legsregs/directives/techadv/t504035.htm>.

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Numerous technical advisories on various pavement topics are now available on the Federal Highway Administration's (FHWA) Office of Pavement Technology web site at <www.fhwa.dot.gov/pavement/ta.htm>. The advisories provide technical guidance and information on recommended practices. Advisories currently listed are:

- Asphalt Concrete Mix Design and Field Control
- Paved Shoulders
- Open Graded Friction Courses
- Use of Coal Ash in Embankments and Bases
- Development and Review of Specifications

* * *

The AASHTO Road Test had nearly a dozen performance variables for two pavement types, 836 test sections, and 1.1 million test load applications over two years. Obviously, this road test completed in the 1950s produced a lot of data, mostly consisting of handwritten numbers recorded in the field and in laboratories. How to safeguard access to the data, which fill many pages in many binders? Here is the answer. The Smithsonian Institution's National Museum of American History will house the AASHTO Road Test collection in its Archives Center in Washington, D.C.

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The National Center for Asphalt Technology (NCAT), the Asphalt Institute, and the University of New Hampshire are partners for a major NCHRP Project titled, "Endurance Limit of HMA Mixtures to Prevent Fa-

tigue Cracking in Flexible Pavements." The purpose of this research project is twofold: (1) to determine if there is an endurance limit for asphalt mixes and the applicable range of strain levels that coincide with the endurance limit, and (2) to recommend a procedure to incorporate the endurance limit into mechanistic pavement design methods.

* * *

The Asphalt Pavement Alliance (APA) has published a position paper, "Pavement Type Selection Processes," which discusses in detail the advantages of asphalt pavement for each of the factors listed in the 1993 AASHTO Design Guide, Appendix B. The APA has also developed "Flexible Perpetual Pavement Design and Analysis Software" (PERROAD 2.4) for the design of long-life asphalt pavements. Both the position paper and software are available at <www.asphaltalliance.com>.

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The Asphalt Pavement Alliance has released an interactive CD-ROM, "Rubblization: The Quick, Cost Effective, Environmentally Friendly Fix for Failed Concrete Pavement." The CD provides examples of how rubblization has been used successfully and discusses when it is an appropriate rehabilitation strategy for concrete pavements that have reached the end of their life. The CD features the latest innovation in rubblization technology. It is available at <www.asphaltalliance.com>.

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The Second International Conference of Accelerated Pavement Testing was held in Minneapolis, MN, USA on Septem-

ber 26-29, 2004. The Conference was organized under the auspices of the Transportation Research Board Committee A2B09 Full Scale/Accelerated Pavement Testing. 165 people from 20 countries attended the conference.

Professor Fred Hugo, University of Stellenbosch, South Africa; Professor John Metcalf, Louisiana State University, USA; and Kieran Sharp, ARRB Transport Research, Ltd, Australia presented the opening updates. The topics in various sessions included: Unbound Materials, Superpave Pavement Structures Evaluation, MnRoad Phase-1 Summary, European Cooperation on Cost 347, a ten-year perspective of APT by CALTRANS, a CEDEX Update, NCAT Test Track, FAA, LINTRACK, and PWR1 Update from Japan.

Conference Reviews were also presented by Professors Joe Mahoney, University of Washington; John Harvey, University of CA - Davis; and Mihai Marastaneu, University of Minnesota. Information and a CD-Rom are available on the MnROAD website at:

www.mnroad.dot.mn.us/research or call Ben Worel at 651-779-5522

* * *

A workshop on "Factors Affecting Compaction on Asphalt Pavements" will be held at the annual meeting of the Transportation Research Board in Washington, DC on January 9, 2005 (Sunday) at 1:30 pm. One of the sessions in this workshop will be devoted to "Longitudinal Joint Density", which is considered to be very important in obtaining durable longitudinal joints in asphalt pavements.

NEWS FROM EUROPE

The University of Erfurt (Germany) and Hermann Kirchner GmbH Construction Company have developed the Compact-asphalt paving method. In this method, the paver paves two asphalt layers at the same time. One of the advantages is that a thin surface layer can be used. The thin surface layer is paved together with the binder layer. Together, the two layers have more heat capacity and a better compaction can be achieved. Besides paving motorways and country roads in Germany, this method has also been used in Sweden and the Netherlands. Until now about one million square meters of paving has been done.

The four photographs accompanying this article show the Compact-asphalt paving on Route A20 near Klempenow (about 170 km north of Berlin) in July this year. The paving width is 10.5 meters.

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General view of the Compact-asphalt paving train

The **3rd Eurasphalt & Euro-bitume Congress** was held in Vienna, Austria on May 12-14, 2004. Some of the general conclusions prepared by Egbert Beuving, chairman of the E&E 2004 Technical Committee are as follows:

- Building long lasting noise-reducing asphalt pavements is a challenge for the industry. The clogging of the pavement needs to be dealt with. Although double-layered porous asphalt

pavement is a solution, new techniques need to be developed.

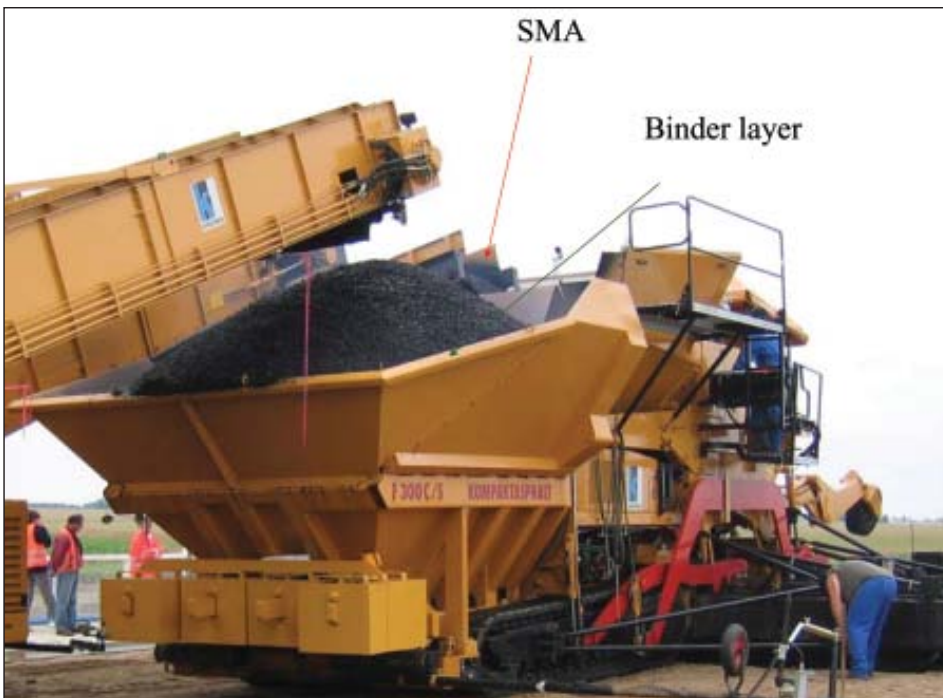
- High proportions of reclaimed asphalt need to be used in the surface courses. Several papers addressed this item.

- We need to use high technology to build high quality roads. Technologies presented at the Congress were: modern paving machine guidance system; use of gamma rays to measure mix composition and thickness; and a prefabricated noise-reducing road that can be quickly unrolled as a carpet and replaced.

- Functional specifications need to be adopted so that the industry is stimulated to provide innovative solutions.

- Cold and warm asphalt techniques are improving in quality, and these techniques will increasingly be used in Europe.

- A fast method to detect tar in roadways and safe procedures to handle its disposal, need to be developed. Several non-tar containing products that can be used to produce fuel-resistant asphalt mixes were presented at the Congress.



SMA and binder layer mix being fed separately into paver hoppers

- Both neat and polymer-modified bitumens age in different ways according to their chemical composition and microstructure. We do not fully understand the aging phenomenon although some progress has been made.

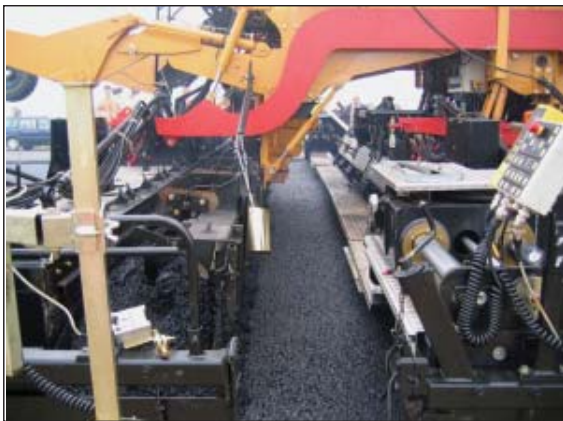
- Wheel tracking tests are frequently being used to test the rut resistance of HMA. However, fundamental tests such as triaxial repeated load tests are important tests.

The reports of the moderators of different sessions can be seen at <www.eecongress.org>.

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An extraordinary runway reconstruction project is underway at the Frankfurt International Airport. To be completed in the summer of 2005, the Runway North reconstruction will comprise 300 incremental construction steps to be completed over 300 nights so that regular operations of the airport are not affected. Each night, the old asphalt pavement is broken up and removed. A 60-centimeter-thick asphalt layer is applied on the compacted gravel and sand runway foundation.

Following intense testing of materials, a high-tech, low-temperature mixture of asphalt and synthetic resin was selected.



Two screeds in operation



Mat behind the paver consisting of binder course and SMA

This mixture can be applied even during relatively low temperatures and then used shortly thereafter by aircraft taking off or landing. All the asphalt mix is produced in advance, is stored near the airport, and is available when the paving starts. The low-temperature asphalt was produced with Sasobit in the beginning. Now Shell bitumen with a paraffin wax is being used.

This unique runway reconstruction project in Frankfurt is generating substantial interest around the world. Pictures of this reconstruction can be seen at <www.kirchhoffheine.de/aktuelles/Fraport/Fraportnacht1/index.html>.

(Editor: The assistance of Egbert Beuving in providing the news from Europe is greatly appreciated.)

NEWS FROM AUSTRALIA

Austrroads has recognized the importance of maintaining a minimum level of technical research capacity within Australia in the following four key areas: (a) bituminous surfacings, (b) pavement structures, (c) asset management, and (d) engineering safety. Austrroads will provide a total of \$4 million per year for the first three years of a rolling three-year program to ARRB Transport Research. Bituminous surfacing has been given a high priority and the following topics have been identified:

- **Sprayed Seals** (maintaining Australian expertise in sprayed seals)
- **Binders** (maximizing the benefits from polymer modified bitumens and using bitumens from overseas)
- **Asphalt** (delivering better quality asphalt and promoting new asphalt technology)

- **Pavements** (horizontal impact of heavy vehicles on pavements)

The Australian Asphalt Pavement Association (AAPA) has also undertaken to support the Austroads program with AAPA contributing to the following jointly funded projects:

- Finalization of the Austroads sprayed seal design procedure
- Development of a practical workability measure for asphalt
- Precision of asphalt and binder test procedures
- Effect of storage and transport on PMB properties

* * *

The Australian Asphalt Pavement Association (AAPA) has conducted successful Study Tours since 1975, involving representatives from industry, users, research organizations, consultants, and academia. The most recent 2004 Study Tour was conducted from June 6 to 19 based around attendance at the ISAP/NCAT International Conference on Long Lasting Pavements at Auburn, Alabama followed by visits to NCAT, Astec Industries, National Asphalt Pavement Association, Maryland State Highway Administration, Virginia Department of Transportation, and Illinois Department of Transportation.

* * *

At the meeting of the National Asphalt Research Co-ordination (NARC) Group meeting held in Brisbane in August 2004, road authority members raised the following asphalt workmanship related issues of concern: segregation, ride quality, and jointing techniques. A guide to identifying the causes of segregation and minimizing its occurrence is provided in AAPA Ad-

visory Note 18, Asphalt Segregation. Other workmanship related issues are included in a number of AAPA Pavement Work Tips as follows:

- No. 3:** Asphalt Riding Quality
- No. 4:** Asphalt Joints
- No. 5:** Asphalt Handwork

Both the Advisory Notes and Pavement Work Tips can be accessed and downloaded free from the AAPA website <www.aapa.asn.au>.

NEWS FROM SOUTH AFRICA

Dr. Fritz Jooste of Modelling and Analysis Systems has developed a new Rubicon suite of flexible pavement design and analysis software, which is finding increasing use among South African consultants and engineers. The Rubicon software suite focuses on continued product improvement by incorporating new pavement technologies. A recent example is the incorporation of the transfer functions for foamed bitumen layers in flexible pavements after publication of TG2: "Interim Technical Guidelines for the Design and Use of Foamed Bitumen Treated Materials."

In addition to the transfer functions from a range of countries, the software includes linear layered elastic and finite element response models, as well as the more traditional AASHTO (1986 version) and catalog design methods. The Rubicon provides a comprehensive approach to pavement design, in which designers can evaluate design inputs not only through the manual and automated back calculation modules, but also through the stress-

sensitive finite element model, which evaluates the material stiffness in different locations within the pavement.

* * *

The South African National Roads Agency Limited (SANRAL) has made the decision to prohibit the use of tar-based products on its projects. While the effectiveness of these products, which are used for prime coats and pre-coating material for aggregates in surface seals, cannot be questioned, the SANRAL made this decision based on its corporate environmental policy.

* * *

The 8th Conference on Asphalt Pavements for Southern Africa (CAPSA '04) was held on September 12-16, 2004 in Sun City, North West Province, South Africa. Papers in Theme 4, "Materials, Design and Construction" included the following topics:

- Binder specifications
- Performance of modified binders
- Innovative asphalt mixes including thin surfaces and noise reduction systems
- Numerical modeling of seals and HMA using complex finite element methods incorporating visco-elasto-plastic behavior
- Cold mix technology, with new pavement design functions, and cold in-place recycling case studies

Full details of the conference are available on the CAPSA '04 website <<http://asac.csir.co.za/capsa>>.

UPCOMING EVENTS

Please inform Dr. Eugene Skok, Jr., Executive Administrator of the ISAP office, at <secretary@asphalt.org> of any upcoming events so that we can include them in the calendar.

DATE	EVENT	LOCATION	CONTACT
Oct. 19-24, 2004	6th International Conference on Managing Pavements	Brisbane, Australia	<www.icmp6.com>
Oct. 28-31, 2004	3 rd International Symposium on Asphalt Emulsion Technology	Washington, DC, USA	email: <krissoff@aema.org>
Nov. 21-24, 2004	49th Annual Conference of the Canadian Technical Asphalt Association	Montreal, Quebec, Canada	<www.ctaa.ca>
Jan. 5-8, 2005	Advanced Constitutive Modeling course of Asphalt Materials	University of Maryland, College Park, Maryland, USA	<www.insapconmod.nl>
Jan. 9-13, 2005	84 th Annual Meeting of Transportation Research Board	Washington, DC, USA	<www.trb.org>
Feb. 13-17, 2005	50th Annual Convention of the National Asphalt Pavement Association	The Big Island, Hawaii, USA	<www.hotmix.org>
Mar. 1-5, 2005	AEMA-ARRA-ISSA Annual Meeting	Bal Harbour, FL, USA	email <krissoff@aema.org>
Mar. 7-9, 2005	Annual Meeting of the Association of Asphalt Paving Technologists	Long Beach, CA, USA	<www.asphalttechnology.org>
Mar. 14-16, 2005	International Symposium on Pavement Recycling	Sau Paulo, Brazil	<www.abpv.org.br/simposoispbrazil.htm>
June 16-20, 2005	International Road Federation, 15th World Meeting	Bangkok, Thailand	email: <irf2005@bkkrai.com>
June 27-29, 2005	7th International Conference on Bearing Capacity of Roads, Railway, and Airfields	Trondheim, Norway	<www.ntnu.no/forskning/konfover>
Nov. 6-9, 2005	50th Annual Conference of the Canadian Technical Asphalt Association	Victoria, British Columbia, Canada	<www.ctaa.ca>
Jan. 22-26, 2006	85 th Annual Meeting of Transportation Research Board	Washington, DC, USA	<www.trb.org>
Mar. 14-16, 2006	World of Asphalt 2006 Show & Conference	Orlando, FL, USA	<www.worldofasphalt.com>
Mar. 27-29, 2006	Annual Meeting of the Association of Asphalt Paving Technologists	Savannah, GA, USA	<www.asphalttechnology.org>
Aug. 12-17, 2006	10th International Conference on Asphalt Pavements (ISAP)	Quebec, Canada	<www.ICAP2006.fsq.ulaval.ca>

NCAT TEST TRACK UPDATE

Trucking for the 2003 NCAT Pavement Test Track is approximately 34 percent complete (3.4 millions ESALs).

With the development of extensive fatigue cracking in some sections within the structural experiment, it became necessary to implement a system to map surface cracks. Early on Monday mornings (the day the trucking operation is suspended) before the pavement heats up and small cracks become more difficult to see, a visual inspection is performed where the beginning and ending point of each crack is carefully marked with a paint pen.

When full alligator cracking develops, the corner boundaries of cracked areas are marked in a similar manner. A video camera is then mounted on a forklift boom such that a full lane width vertical picture of the surface of the pavement can be obtained.

The cross-sections of eight structural test sections along with the mixtures used therein, were given in the Fall 2003 issue of the Asphalt Technology News. This issue can be seen on the NCAT web site, <www.ncat.us>.

Extensive fatigue cracking is occurring in the thinner N1 and N2 structural test sections, as shown in the photographs A and B.



Photograph A. Fatigue cracking in Structural Test Section N1



Photograph B. Fatigue cracking in Structural Test Section N2



NOTTINGHAM CELEBRATES FIFTY YEARS OF PAVEMENT RESEARCH

Fifty years is a long time and the range of pavement related research projects at the University of Nottingham has been wide, a fact which has distinguished its pavement engineering from that at many other institutions around the world which have generally focused on narrower aspects of the subject. The interests of the staff, who have lead the research, have always focused on the needs of pavement design and, in more recent years, of pavement rehabilitation.

Peter Pell (now Emeritus Professor), started work at the University as a research assistant in July 1954 on a project, funded by Shell, to investigate fatigue cracking in bitumen. Professor Sir Joseph Pope negotiated that contract with Shell. From 1956 to 1965, Peter Pell was the only member of staff with an interest in asphalt pavement engineering. Stephen Brown who like him was a research assistant on a Shell contract joined him in 1965. They led the research together until Andrew Dawson was appointed 18 years later. Since 1983, Stephen Brown has led the team, which has expanded significantly to its present complement of five staff and a total population of about 40 people working on research projects, supported by grants and contracts worth £1.2 million per year.

Over the years, Nottingham has made significant contributions in the following areas:



(from left to right) Professor Sir Joseph Pope, Prof. Stephen Brown, Prof. Andy Collop, and Professor Emeritus Peter Pell at the 50th anniversary of the Pavement Engineering Research Group at the University of Nottingham

- Analytical pavement design
- Asphalt mixture design
- Asphalt mixture durability
- Pavement evaluation
- Geosynthetics in pavement

There are ambitious plans to expand pavement engineering at Nottingham, so the future will be exciting and the activities of

Nottingham Centre for Pavement Engineering will continue to be of service and interest to the asphalt industry and profession for many years to come. (Condensed from article "Fifty Years of Pavement Research at Nottingham" by Prof. S.F. Brown)

ISAP CONFERENCE PROCEEDINGS

Proceedings of the most recent ISAP conference (9th, 8th, and 7th) are available in either hardcover or on CD. The CD version is in Acrobat format and is indexed and searchable. You can also print individual papers from the CD.

Hardcover versions are on **special sale to**

reduce storage problems. CDs have also been reduced in price because we want the knowledge resources they contain to gain wide circulation.

Sale prices are shown in the table below. **Note that Members enjoy great savings.**

Proceedings	ISAP Member	Non-Member
9th Conference		
Book (was \$250)	\$100	\$150
CD (was \$200)	\$25	\$100
8th Conference		
Book (was \$150)	\$40	\$80
CD (was \$100)	\$25	\$100
7th Conference		
Book (was \$150)	\$40	\$80
CD (was \$100)	\$25	\$100

80th AAPT ANNUAL MEETING AND TECHNICAL SESSIONS TO BE HELD AT HYATT REGENCY HOTEL IN LONG BEACH, CALIFORNIA March 7-9, 2005

The 80th Annual Meeting and Technical Sessions of AAPT are scheduled for March 7-9, 2005, at the Hyatt Regency Hotel in Long Beach, California. There will be attendees from around the World. They represent suppliers, consultants, contractors, universities, government agencies and other researchers. Their common interest is research into materials and methods on how to build better roads.

The technical sessions will include 23 papers grouped into a Workshop Session and four other sessions each with five papers. The Workshop ses-

sion will include papers on segregation detection, minimum lift thicknesses for good compaction and Wisconsin warranty projects before, during and after construction. The session subjects will be:

- Asphalt binder characteristics and evaluation
- Mixture design and moisture susceptibility
- Mechanistic design evaluation of performance models for permanent deformation and fatigue cracking
- Performance Modeling of asphalt mixtures.

Each of the sessions includes presentations by experts in the field followed by open discussions. The papers and discussions will be published in Volume 74 of the AAPT Journal.

There have been 65 paper offers for the March 2005 AAPT Meeting. The Board of Directors has developed the technical sessions from these offers at their October meeting. This information along with registration details will be found on the AAPT webpage: www.asphalttechnology.org or you can call the AAPT Office at 651-293-9188

NCAT HOSTS AUTOMATED, REAL- TIME QUALITY CONTROL OPEN HOUSE

The National Center for Asphalt Technology (NCAT) hosted an open house on July 20-21, 2004 for demonstrating automated, real-time quality control (QC) for hot mix asphalt. The Alabama Department of Transportation and the Federal Highway Administration contracted with East Alabama Paving Company to buy some automation equipment and install it on their plant in Opelika, Alabama. NCAT and the Alabama DOT are developing a system to automate sampling and testing of materials during HMA production. The open house was attended by HMA industry and DOT representatives from all over the United States.

Background

Current quality control methods for hot mix asphalt are manpower and time intensive, which leads to inefficient gathering of information needed to monitor and control the production of quality asphalt mixtures. The majority of attention in QC testing is now spent on sampling and testing after the mixtures are produced. Considering that it typically takes about three hours to complete the suite of tests commonly used for QC of asphalt mixtures, and that the majority of plants commonly produce HMA at rates of 200 to 300 tons per hour, then it is common for 600 to 900 tons of HMA to be produced between tests. This lag of information puts the HMA producer at significant financial risk and the customer (i.e. agency) at risk of accepting a significant amount of poor quality materials.



More than 100 asphalt industry professionals attended the open house.



Microwave moisture probe on the conveyor belt

Purpose and Scope

This project was established to explore possible new ways of gathering real-time quality control information. If the concept of real-time QC appears feasible, a strategy for the evaluation of new methods and technologies should be developed.

The two primary goals of real-time testing are: first, to dramatically shrink the time lag for quality control information, and second, to improve the reliability of the data (i.e. significantly reduce sampling and testing variability). Ultimately, these improvements should reduce the risks to producers and customers and lead to better pavement performance by providing better materials quality control.

As it is envisioned, real-time automated testing is a quantum leap ahead in quality assurance. Real-time testing will involve automated feedback during the mix production process and construction operations. Automated testing is envisioned to mean that information is obtained without direct human interaction.

New Devices for Automated QC Testing

This QC Automation Open House highlighted the following methods for sampling and testing of materials during the production of HMA. These devices installed on East Alabama Paving Company's Opelika plant are being evaluated by NCAT.

1. Automated Belt Sampling of Aggregate and RAP
2. Automated Moisture Contents of Aggregate and RAP Using Moisture Probes and Sample Drying Units
3. Automated Gradation of Virgin Aggregates
4. Automated Viscosity of Asphalt Binders
5. Automated Calibration of Asphalt Meters
6. Automated Measurement of Mix Temperature
7. Automated Data Collection and Management

The evaluation of automated, real-time QC devices in this project is expected to be completed by NCAT by the end of this year.



Automated gradation device