

The ISAP Reporter

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Editor: Prithvi (Ken) Kandhal



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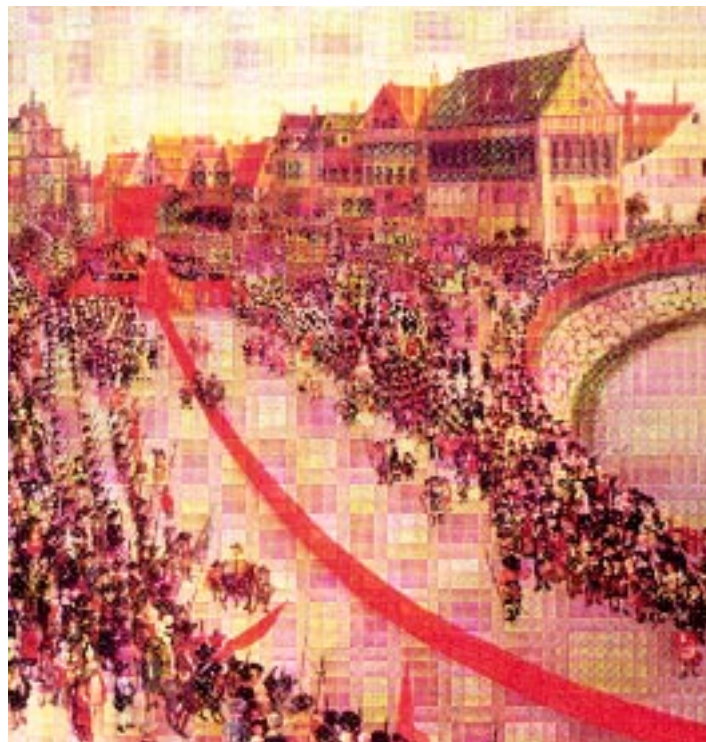
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WELCOME TO NINTH INTERNATIONAL CONFERENCE ON ASPHALT PAVEMENTS

The Executive Committee of the International Society for Asphalt Pavements (ISAP) would like to welcome you to the Ninth International Conference on Asphalt Pavements to be held on August 17-22, 2002 in Copenhagen, Denmark. According to Hans Ertman Larsen, co-chairman of the conference, there are many reasons to welcome you as a participant or as an accompanying guest. The conference will offer you a superb programme of contributions from many countries

around the world. The conference is the ninth in the series known as the "Ann Arbor Conferences." Begun in 1962 at the University of Michigan in the City of Ann Arbor, conferences have been held alternatively in the USA (Ann Arbor and Seattle), and in Europe (London, Delft, and Nottingham), at five-yearly intervals. The 2002 Conference will cover a broad field of topics to encourage cross-fertilisation of ideas between design and materials engineers, teachers, lecturers, students,



researchers, suppliers, and road construction contractors. The core of the programme consists of about 30 technical sessions, including more than 100 contributed presentations. The following specific sessions have
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—International Conference

(continued from page 1)
been planned under five conference topics:

Design

(1) Binder rheology, (2) Design parameters, (3) Fatigue properties, (4) Foamed bitumen, (5) Healing and bonding, (6) Materials models, (7) Mix design, (8) Response models, (9) Seasonal effects, and (10) Structural design.

Construction and Maintenance

(1) Reflective cracking, porous asphalt, and homogeneity, (2) Contractual relationships and traffic interaction, (3) Preventative maintenance, surfacings, and compaction, and (4) Rehabilitation and reconstruction.

Performance

(1) Road assessment by FWD and other methods, (2) Pavement management systems, (3) Innovative field measurement techniques, (4) Performance models, (5) Evaluation of pavement performance, and (6) Surfacings - the driver/pavement interface.

Environment

(1) Noise reducing pavements, (2) Life cycle analysis, and (3) Performance of noise reducing porous pavements.

Accelerated Testing

(1) Accelerated testing under varying climatic conditions, and (2) Development of rutting under accelerated loading.

Prior to the Conference, the following tutorials and workshops will be held.

Tutorials

(1) Superpave mix design, construction, and performance testing, (2) Alternative materials, (3) Mechanistic pavement design, (4) Life cycle assessment,

(5) Thin layer technology, (6) Back calculation for pavement analysis, (7) Road traffic noise, (8) Low volume roads, and (9) Surface characteristics/performance models.

Workshops

(1) Accelerated testing, and (2) Pavement performance data analysis.

As can be seen from the preceding topics, the Conference will embrace research and practice with respect to design, construction and performance of asphalt pavements and take the latest development in technology into consideration. The 2002 Conference will provide fora for discussions about production of superior and cost-efficient pavements. In addition, the 2002 Conference will focus on the environmental aspects of design, construction and maintenance of flexible road pavements. Alongside the Conference an exhibition will allow you to obtain information on new technologies, products and services.

Please feel free to find out more about Ninth International Conference on Asphalt Pavements, the many professional activities and social events by entering our up-to-date websites; www.asphalt.org or www.vd.dk. Here you can consult the programme and get information about Denmark, register on-line and book your accommodation or your tours.

ISAP CHAIRMAN'S REPORT FOR YEAR 2001

The Society has had an active year in terms of work carried out by the



Stephen Brown

Board to set the scene for a more focussed and realistic approach to future activities that will lead to increased membership.

The revised Strategic Plan was accepted by the Board and its key objectives are being pursued. They are:-

1. Organise international conferences at 4-year intervals.
2. Organise themed international symposia, also at 4-year intervals (staggered by two years from the international conferences).
3. Continue with the Distinguished Lecture series for delivery at appropriate events and publication on the web site.
4. Improve and exploit the web site at <http://www.asphalt.org>.
5. Develop productive relationships with the major asphalt pavement associations around the world.
6. Improve and develop the Newsletter.
7. Develop a technical database in co-operation with others.

During the year 2001 the Board held its annual meeting in Washington in January and the Executive Committee met at Clearwater Beach, Florida, in March and at St Paul, Minnesota in July. Plans for the 9th International Conference on Asphalt Pavements, to be held in Copenhagen from 17-22 August 2002, were developed by the local group under Hans Ertman-Larsen. I visited them in Copenhagen in August to ensure good communications with the Board.

This year will be a very important one for the Society in its drive to increase membership and activity because of the incidence of the Copenhagen

(continued on page 3)

Conference, which is our flagship event.

I am pleased to announce that, at our annual Board meeting held in Washington this January 2002, decisions were made about our next two principal events. The 10th International Conference will be held in 2006 in Quebec and our first themed symposium in 2004 in Atlanta. These decisions were based on bids made by three groups to host the 10th Conference. They were backed, in two cases, by excellent submissions and oral presentations to the Board.

The future pattern of major events is thus taking shape with a technical occasion every two years; a themed symposium followed by the International Conference. The Board also sponsors other conferences and is presently committed to continue supporting the International Conferences on Managing Pavements (the next one will be held in Brisbane, Australia in 2004) and the 4th European Symposium on the Performance of Bituminous and Hydraulic Materials in Pavements scheduled for 11 and 12 April 2002 in Nottingham, UK. The Board has also been asked to sponsor the 2nd International Conference on Accelerated Pavement Testing to be held in Minneapolis in 2004.

The web site has continued to develop under Gerhard Kennepohl's leadership and is regarded as a vital medium for communications. The Board is anxious to ensure that e-mail communication with members can become universal as soon as possible.

In order to assist with the expansion in membership, the Board has simplified the categories by introducing a "Corpo-

rate Member" class to replace the "Sustaining" and "Supporting" member classes. For a fee selected from the range which is available, a named number of voting members is accepted for a particular organisation which pays the subscription. Additional members may receive mailings from the Society. This class of membership shows significant savings on the individual member grade. Full details will be posted on the web site (also see the related article in this newsletter).

A new publicity brochure is currently being finalised by the Membership Committee under Gerhard Kennepohl. In addition, joint membership with regional societies and institutes around the world is to be seriously pursued on the basis of providing the benefits of membership for both organisations at a saving on the combined subscriptions.

Thank you for your continuing support for ISAP. I look forward to meeting as many of you as possible this August in Copenhagen.

Stephen Brown
Chairman, ISAP
January 2002

ISAP UPDATES **MEMBERSHIP** **CATEGORIES**

The ISAP Board of Directors has adopted a revised set of membership categories. A new "Corporate Membership" category has been added. The Associate, Voting and Patron categories have been retained.

Associate Membership is for students and others new to the field of asphalt technology. They do not have voting privileges

and can not serve on the Board of Directors. The current annual dues are \$50.

Voting Members are for people in the field who are interested in developing their knowledge in the field. They have voting privileges and may serve on the Board of Directors. The current annual dues are \$100.

A Corporate Membership Category has been added with four levels. The purpose of this category is that a given organization can designate the indicated number of ISAP Voting Members within their group. In this way the information developed by ISAP can be disseminated more efficiently. The following Corporate Membership levels have been defined:

Level	Number of Voting Members	Annual Dues
I	50	\$4,000
II	25	2,000
III	12	1,000
IV	6	400

The Patron Membership Category has been retained. In addition to designating 50 Voting Members a Patron Member can designate a person to serve on the Board of Directors and be listed on the ISAP letterhead.

The Board of Directors modified the membership categories to better carry out the ISAP objectives which are to promote internationally the interaction and exchange of information for the advancement and dissemination of knowledge in the design, construction, maintenance, rehabilitation, economy and management of asphalt pavements, while recognizing practical problems and encouraging efforts towards their solution.

NCAT TEST TRACK UPDATE

The National Center for Asphalt Technology (NCAT) Pavement Test Track was completed in July 2000. Nine states and the Federal Highway Administration cooperatively sponsored the inaugural round of hot mix asphalt (HMA) research at this facility. Forty-six test sections (each 200 feet long) consisting of different aggregate types, gradations, binder types, asphalt contents, and mix types were constructed. Trafficking of the pavement began in September 2000. By the end of March 2002, approximately 75% of the target "design lifetime" truck traffic (10 million ESALs) would be applied.

The test track is primarily a rutting study. Robust HMA base layers are designed to support experimental surface mixes in a "perpetual pavement" manner, where a permanent hot-mix asphalt foundation could remain in place with periodic removal and replacement of surface mixes (in this case, on three-year research cycles).

Every Monday, trucking operations are interrupted to accommodate weekly pavement management studies. A key component of this weekly distress measurement effort is intended to accurately and continuously quantify the relationship between ESAL accumulations and rutting throughout each experimental section. When rutting data for every section is averaged over time, the resulting plot reveals the deformation curve as a function of ESAL accumulation. By superimposing seven-day average high temperatures for the preceding performance week, the effect of seasonal temperature



variation is also observed (see Figure 1).

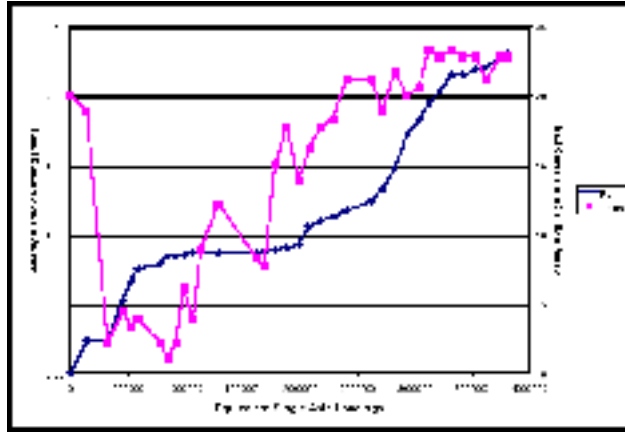


Figure 1

The implementation of Superpave methods over the last decade has left many state DOTs wondering whether to promote mixes designed on the fine or coarse side of the maximum density line. Research efforts intended to address this issue have been somewhat ambiguous; consequently, several Track sponsors chose to compare the performance of fine and coarse graded mixes using aggregate sources relevant to their local operations.

Results to date generally reflect slightly improved resistance to permanent deformation for mixes designed on the coarse side of the maximum density line. The performance enhancement associated with producing mixes with modified binders is also being

documented, as is the reduction in performance for replicate

mixes produced with simulated construction variability in binder content. As one would intuitively expect, the two mixes with the most rutting at the end of the hottest months of 2001 both contained unmodified binder at optimum plus one half percent (see Figure 2). This information

will be useful for life cycle cost analyses and cost-based computations for production pay factors.

Final conclusions will consider all information generated through the end of trucking operations in November of 2002; however, several preliminary findings of interest to the pavement industry may be summarized as follows:

- Evidence suggests the existence of a quantifiable relationship between roughness and fuel consumption in trucking operations. As pavements get

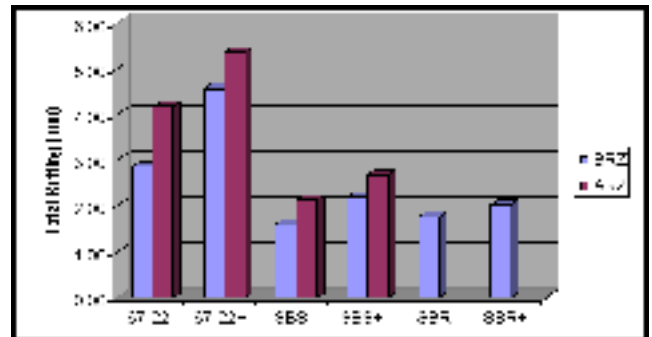


Figure 2

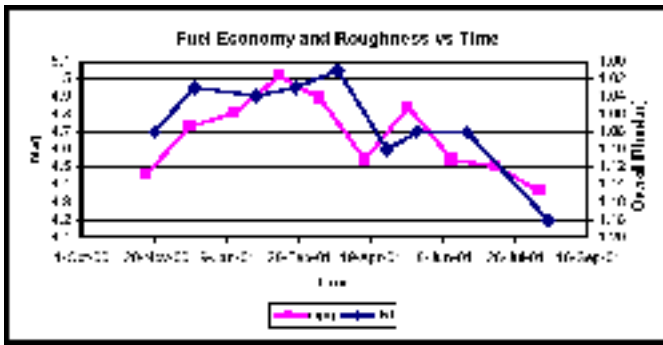


Figure 3

rougher, an increase in fuel consumption has been observed (see Figure 3).

- The rate of rutting on the Track has increased with air temperature, which may facilitate the development of formal relationships for different mix

overall) over the first half of traffic.

- In comparison studies where different binder grades were used to produce mixes with the same aggregate blends, an average decrease in rutting of 37% has been observed in mixes

types. As expected, the rate of rutting decreased in the winter and increased in the summer.

- Generally, coarse-graded mixes have rutted slightly less than fine-graded mixes (by about 21%

with higher PG grades.

- Although gradation type affects initial coefficient of friction measurements, the differences diminish as traffic accumulates in mixes with similar aggregates.

- Mats with coarser surface textures are more effective at removing rainwater. Coarse mixes are more efficient than fine mixes, and SMAs are more efficient than coarse mixes, but open-graded mixes are the most effective in reducing road spray.

Construction and performance information is available online at <http://www.pavetrack.com>.

NEWS FROM AUSTRALIA

A highly successful flexible pavements industry's annual conference was held on September 9-10, 2001 in Gold Coast, Queensland. The theme of the conference organized by the Australian Asphalt Pavement Association (AAPA) was "Seeking Improvement." Some of the papers of general interest presented are as follows: (1) Fatigue improvement of asphalt reinforced by glass fibre grid, (2) Ultimate performance with electric heated screeds, (3) IARC epidemiological study among asphalt workers, (4) Adapting South African solutions to South Australia, (5) The impact of skid resistance on surfacings, (6) Cleaning open graded asphalts, (7) Asphalt production and paving at intermediate temperatures (warm mixed asphalt), (8) Effect of storage and transport on polymer modified binders, (9) Fatigue characterization of stone mastic asphalt mixes, (10) Armour coat your

asphalt roads, and (11) Fatigue master curves.

Copies of the conference proceedings are available for purchase from AAPA: email info@aapa.asn.au.

Austrroads has produced a new publication, "Specification Framework for Polymer Modified Binders." The publication outlines the requirements for PMBs, including crumb (scrap) rubber for use in both sprayed sealing and asphalt mix applications. The publication, code named APT04, was produced by an Austrroads PMB Project Group. Specification limits in the publication are based on the results of nationally coordinated field trials and laboratory studies, supplemented by Austrroads Member Authority experience gained over the last few years.

The report is structured in two parts: Part 1 - Specification Framework, and Part 2 - Introduction to PMB Selection Criteria. Copies of APT04 are available from AAPA.

AAPA is planning to undertake a study tour incorporating the ISAP Conference in Copenhagen, Denmark, and a week of additional meetings in Germany (Hanover region), France (in and near Paris), and England (London and Nottingham University's new pavements research facility).

NEWS FROM SOUTH AFRICA

The Southern African Bitumen Association (SABITA) has initiated steps to have bituminous waste reclassified. No guidelines exist at the present time to define best practice techniques for the handling and disposal of bituminous waste, and the issue is further complicated by the anomalous classification of bitumen—which has never been proved to pose any threat to human or environmental health—as a hazardous prod-

(continued on page 6)

— South Africa

(continued from page 5)

uct under the Hazardous Materials Act. Sabita believes the inclusion of bitumen in this classification, alongside coal tar (a proven carcinogen), militates unreasonably against the efficient and cost-effective disposal of bituminous waste products.

Sabita has briefed specialist consultants to submit proposals for the reclassification of bitumen as a non-hazardous material.

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Comprehensive guidelines have been developed for modified binders in southern Africa. These are based on generic specifications covering generic classes of binders, leaving the onus on the manufacturer to supply a conforming product rather than to work to a prescriptive recipe. The guideline document covers the requirements for generic classes of homogenous (thermoplastic polymers) as well as non-homogenous (bitumen rubber) modified binders for use in surface seals and hot mix asphalt applications. It includes, in particular, recommendations on the appropriate selection criteria (most appropriate product for a specific application), product property requirements and quality control measures for the procurement and applications of these binders.

[Excerpted from **Asphalt News**, published by SABITA]

Nottingham Centre for
Pavement Engineering

Nottingham Centre for Pavement Engineering Opens

A major new research facility was opened at the University of Nottingham in the UK in September 2001. The \$3.6m Nottingham Centre for Pavement Engineering (NCPE) building has 1700 m² of laboratory space on two floors and houses the offices of Professor Stephen Brown and his research team on the third floor. Extensive capabilities have been created for analytical and mechanical testing of bituminous binders and for testing of asphalt mixtures and pavement sections in the pilot scale Pavement Test Facility. This exciting development has come about as a result of a 10 year, £6.5m contract between the University and Shell to provide research and technical services to the company. Shell have transferred extensive equipment from their former laboratory to Nottingham and the University has moved their facilities from their old building to form a purpose built laboratory for the 21st century.

In addition to the provision of services to Shell, NCPE ac-

commodates the expanding research activities of the University team and provides commercial testing services to other clients. The University's spin-off consultancy, Scott Wilson Pavement Engineering (SWPE), has offices close by on the Nottingham Science and Technology Park. Consequently, Nottingham is now a major international centre of excellence for teaching, research, development and practice in pavement engineering. The University team, under Steve Brown's leadership, includes Andrew Collop, Andrew Dawson, Gordon Airey and Nick Thom with 14 research staff and students. Shell Bitumen have five staff based in NCPE under the direction of David Whiteoak and have exclusive use of a laboratory. All other services are provided by the University laboratory team of 10 technicians under the management of Richard Taylor and his deputy, Kevin Gilbert.

Current research includes work on asphalt mixtures incorporating crumb rubber, interface bond conditions in asphalt pavements, durability of high stiffness asphalts, road ironwork installations, the use of secondary aggregates and industrial by products and the



application of shake-down theory to granular materials. An expanding programme of work on rail track is underway, including studies of ballast degradation using discrete particle analysis and appropriate experiments.

The official opening of NCPPE took place on 12th September with 160 guests, including many from the US and other overseas countries. Tim Matthews, the Chief Executive of the UK Highways Agency performed the opening ceremony in the presence of the University's Vice Chancellor, Professor Sir Colin Campbell. At the luncheon, a two-minute silence was observed to mark the previous days horrific events in New York. Stephen Brown recalled the early days of pavement research at Nottingham, initiated through a contract with Shell in 1954. The first research assistant to work on this was Peter Pell whose pioneering studies on asphalt fatigue became known around the world. Peter was present at the opening, as was Sir Joseph Pope, whose friendship with the Shell Director of Research at the time and his own expertise in metal fatigue provided the reasons for pavement research to be initiated in Nottingham.

After lunch, an industry orientated seminar was held with speakers representing consulting, contracting, materials and research following a keynote address by Tim Matthews on the Highways Agency's 10 year road strategy. The following day, 60 people attended a research symposium on new developments on testing of binders and asphalt mixtures. All the speakers were from outside the UK and collectively provided an

extremely interesting overview of current and recent research in this field. This international view reflects the policy of NCPPE, to forge collaborative working arrangements with other leading research groups around the world. Agreements are already in place with the University of California at Berkeley, NCAT in Auburn, Alabama and the University of Illinois, while joint work is already being done with Delft University of Technology in the Netherlands and conversation are taking place with other groups.

Anyone interested in pavement research at Nottingham should log onto the website at www.nottingham.ac.uk/p&g. Applications from potential research students or staff are welcomed.

NEWS FROM EUROPE

The following research reports have been published recently by the Transport Research Laboratory (TRL) of U.K.:

TRL 456 - Development of a performance-based surfacing specification for high performance asphalt

TRL 497 - The design of porous asphalt mixtures to performance-related criteria

TRL 499 - Material performance of porous asphalt, including when laid over concrete

* * *

A new fuel-resisting binder (FRB) has been developed by BP Bitumen (U.K.) specifically for use in hot mix asphalt paving surfaces where resistance to damage from fuel or oil spill is required. It incorporates innovative technology that enables the use of asphalt surfac-

ing in areas previously the domain of coal tar or cement-based products. A number of projects have already been completed in the U.K. using the new product.

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The recycling or re-use of mixes containing coal tar has been banned in the Netherlands. Contractors have been warned not to accept such mixes for processing. All materials containing road tar has to be sent to an authorized plant for disposal.

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A 40-mm 0/11 gussasphalt surface course, containing 50% RAP (reclaimed asphalt pavement), was placed in Leipzig, Germany. Details are contained in **Bitumen**, Volume 63, 2001.

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The performance of asphalt pavements laid and compacted to German and Hungarian standards was compared recently in Hungary. In both cases the best performance on high volume roads was obtained in case of mixes which were most difficult to compact.

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The following research reports have been published in Nordic countries:

- Friction measurement methods and the correlation between road friction and traffic safety. Swedish National Road and Transport Research Institute, Series VTI meddelande 911A. (This report in English is also available as a pdf file on www.vti.se under Reports.)

- Technical performance and long-term noise reduction of porous asphalt pavements. Danish Road Directorate. Report 113 (continued on page 8)

—News from Europe

(continued from page 7)

(English).

- Effect of design parameters

on the microstructure of EVA modified bitumen in special hot mixtures. Danish Road Directorate, Report 110 (English).



UPCOMING EVENTS

Please inform Dr. Eugene Skok, Jr., Executive Manager of the ISAP office of any upcoming events so that we can include them in the calendar.

DATE	EVENT	LOCATION	CONTACT
Mar. 3-7, 2002	NAPA, 47th Annual Convention	San Francisco, California, USA	National Asphalt Pavement Association < http://www.hotmix.org >
Mar. 10-13, 2002	5th ISSA World Congress	Berlin, Germany	International Slurry Surfacing Association < http://www.issa2002.com >
Mar. 18-20, 2002	Association of Asphalt Paving Technologists Annual Meeting and Technical Sessions	Colorado Springs, Colorado, USA	e-mail: < aapt.asphalttechnology@worldnet.att.net > < http://www.asphalttechnology.org >
Mar. 19-23, 2002	ConExpo-Con/Agg Construction Equipment Exposition	Las Vegas, Nevada, USA	Con/Agg Show Office < http://www.conexpoconagg.com >
Mar. 25-25, 2002	SMA in the USA Workshop	Frederick, Maryland, USA	Federal Highways Administration, John Bukowski, tel. (202) 366-1287 e-mail: < john.bukowski@fhwa.dot.gov >
April 2-5, 2002	3rd International Symposium on 3D Finite Element for Pavement: Analysis, Design & Research	Amsterdam, The Netherlands	< http://www.3dfem.org >
April 11-12, 2002	4th European Symposium on Performance of Bituminous & Hydraulic Materials in Pavements	Nottingham, England	University of Nottingham e-mail: < Salah.Zoorob@nottingham.ac.uk > < http://www.nottingham.ac.uk/bitmat4 >
April 14-17, 2002	ICAR 10th Annual Symposium	Baltimore, Maryland, USA	International Center for Aggregates Research tel. (512) 471-4498 e-mail: < icar@mail.ce.utexas.edu > < http://www.ce.utexas.edu/org/icar >
April 23-25, 2002	4th Intern. Conf. on Road & Airfield Pavement Technology	Kunming, Yunnan Province, China	International Conference on Road and Airfield Pavement Technology < http://www.jtzx.net.cn/icpt4.html >
Aug. 17-22, 2002	9th ISAP (Ann Arbor) Conference	Copenhagen, Denmark	International Society for Asphalt Pavements, St Paul, MN < http://www.asphalt.org >

Sep. 1-5, 2002	IRF Asia Pacific Roads Conference & Exhibition 2002, Managing Roads as a Business	Sydney, Australia	Roads Conference Managers e-mail: <road@tourhosts.com.au> <http://www.tourhosts.com/au/roads>
Sep. 22-27, 2002	7th International Conference on Geosynthetics	Nice, France	IPS Consell <http://www.7icg-nice2002.com>
Sep. 24-27, 2002	3rd World Congress on Emulsion	France	"Emulsion in the Third Millennium" <http://www.cme-emulsion.com>
Oct. 21-25, 2002	Joint Conference of the FWD & Road Profilers User Groups on Pavement Evaluation	Roanoke, Virginia, USA	<http://www.conted.vt.edu/pavement.htm>
Nov. 21-22, 2002	3rd International Conference on Bituminous Mixtures & Pavements	Thessaloniki, Greece	<http://www.civil.auth.gr/3iconfbmp>
Jan. 12-16, 2003	82nd Meeting of the Transportation Research Board	Washington, DC, USA	<http://www.trb.org>
Feb., 2003	27th Annual Meeting of the Asphalt Reclaiming & Recycling Association	Fort Lauderdale, Florida, USA	<http://www.arra.org>
Mar., 2003	30th Annual Meeting of the Asphalt Emulsion Manufacturers Association	Las Vegas, Nevada, USA	<http://www.aema.org>
April 14-16, 2003	RILEM Symposium on Performance Testing & Evaluation of Bituminous Materials	Zurich, Switzerland	<http://www.ptebm.ch>
June 22-25, 2003	8th International Conference on Low Volume Roads	Reno, Nevada, USA	Transportation Research Board (TRB) e-mail: lvr8@nas.edu
July 7-10, 2003	3rd International Symposium on Maintenance & Rehabilitation of Pavements	Guimarães, Portugal	Department of Civil Engineering University of Minho, Portugal Tel: + 351 253 510 200 e-mail: <mairepav03@civil.uminho.pt> <http://www.civil.uminho.pt/mairepav03>

NEWS FROM NORTH AMERICA

Carleton University in Ontario, Canada has developed an innovative method for measuring in-situ shear strength of hot mix asphalt course with minimal damage to the pavement surface. The In-Situ Shear Strength Tester (InSiSST) uses a torque cell mounted to a testing plate that is epoxied to the asphalt pavement surface. Pilot testing has been completed to identify, both qualitatively and quantitatively, the potential resistance of different asphalt concrete mixes to rutting. For more information, email <joseph.ponniah@mtg.on.ca>.

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The Second International Symposium on Maintenance and Rehabilitation of Pavements and Technological Control was held at Auburn University in Auburn, Alabama from July 29 to August 1, 2001. The sponsoring organizations for the Symposium were the University of Mississippi (Oxford, Mississippi), National Center for Asphalt Technology (Auburn, Alabama), and Mackenzie Univeristy (Sao Paulo, Brazil). A total of 128 papers and presentations were contributed to the Symposium from 31 different countries. Proceedings from the Symposium can be obtained from Dr. Waheed Uddin from the University of Mississippi, <cvuddin@olemiss.edu>.

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The North-Central Superpave Center and Purdue University have begun an intensive investigation into the effects of various burner fuel types and combustion conditions on the properties of plant-produced hot

mix in a study funded by the South Dakota Department of Transportation.

The project will evaluate mixes produced using 11 different types of fuel in a hot mix plant operating with the burner under optimum, excess oxygen, and insufficient oxygen conditions. Aggregates will be run through the plant first to see if they pick up any contaminants, then hot mix will be produced and sampled under the different fuel-combustion conditions.

The aggregates will be "rinsed" with a solvent, which will then be analyzed using chromatography to detect traces of unburned fuel. The binder will be extracted from the hot mix and similarly analyzed. The mix will also be tested in various other ways to determine if any contamination that may exist has affected the mix properties. It is suspected that mix contamination may result in mix tenderness, lower stability, increased tendency to strip and possibly other problems.

Plant operations will be monitored during production to look for a way to determine, in the field, if proper combustion is being achieved. Possible ways to do this may include the use of a flame eye to monitor the color of the flame, measuring exhaust gas temperatures or composition, etc.

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A searchable database of Superpave information is now available at the website of the North-Central Superpave Center, <<http://rebar.ecn.purdue.edu/Superpave/search.asp>>.

* * *

The Arkansas DOT has embarked on an aggressive five-year program to rebuild their

interstate highway system. A significant portion of the program (over \$600 million) will be devoted to the rubblization (of the existing concrete pavement) plus HMA overlay technology that is growing in use across the U.S.

HOT MIX ASPHALT FACTS IN THE U.S.

- Of the 2.3 million miles of paved roads in the U.S., 94 percent are surfaced with asphalt.
 - In 2000, the estimated production of HMA in the U.S. totaled 550 million tons valued at nearly \$20 billion.
 - There are approximately 3,600 HMA plants located in the U.S.
 - Overall, the asphalt industry directly or indirectly supports nearly 300,000 employees.
 - Asphalt pavement is America's most recycled product. Every year, 73 million tons of reclaimed asphalt pavement are reused, nearly twice as much as paper, glass, aluminum, and plastics combined.
- From **HMA Technology**, September 2001

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The University of Kansas in Lawrence recently completed a study "Evaluations of Expenditures of Rural Interstate Pavements in Kansas." The researchers' conclusions include the following:

- For the rural interstate pavements evaluated, total expenditures in actual dollars and 2001 dollars were less for HMA pavements than PCC pavements.
- Original construction costs per 4-lane mile in 2001 dollars were less for HMA pavements than PCC pavements, \$613,388 to \$823,873, respectively.
- HMA and PCC pavements

had the same average life, 35 years, until reconstruction and rehabilitation. Reconstruction costs for PCC pavements averaged \$2,340,000 per 4-lane mile compared to rehabilitation costs of \$720,000 per 4-lane mile for HMA pavements.

Copies of the study are available from the Asphalt Alliance, email: <bjew@hotmix.org>.

* * *

The Transportation Research Board (www.trb.org) has recently published the following:

- NCHRP Report 452, "Recommended Use of Reclaimed Asphalt Pavement in the Superpave Mix Design: Technician's Manual," 2001
- NCHRP Report 459, "Characterization of Modified Asphalt Binders in Superpave Mix Design," 2001
- NCHRP Report 461, "Investigation of the Restricted Zone in Superpave Aggregate Gradation Specification," 2001
- TRB Circular 503, "Perpetual Bituminous Pavements," 2001

* * *

The Federal Highway Administration Mix Expert Task Group (ETG) has recommended eliminating all references to the Restricted Zone in AASHTO MP-2 and PP-28 based on the findings of NCHRP 9-14 research conducted by the National Center for Asphalt Technology (NCAT). The research indicated that the restricted zone was redundant if the mixture met fine aggregate angularity and volumetric requirements.

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A task force has been developed to recommend calibration procedures for Superpave Gyration Compactors (SGC)

measuring the internal angle during compaction using the angle validation kit developed by the FHWA. In the past, differences have been observed in the bulk specific gravity of specimens compacted using different SGCs.

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The High Temperature Task Group of the Binder ETG is continuing to evaluate different means of determining high temperature performance of asphalt binders. The NCHRP 9-10 recommended approach using repeated shear creep testing appears to provide good relative rankings of the expected rutting performance of asphalt binders when correlated with asphalt mix performance.

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The Pacific Coast Conference on Asphalt Specifications has asked Professor Carl Monismith, University of California at Berkeley, to conduct a laboratory study of the relationship between asphalt binder properties and pavement fatigue performance. The objective is to determine the relevancy of the fatigue parameters in the AASHTO MP-1 PG binder specification.

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The National Asphalt Pavement Association (NAPA) has published the second edition of its Hot Mix Asphalt Paving Handbook. This has been brought up to date and covers recent developments including SHRP, new paving equipment, advances in recycling, new quality control practices and the introduction of new techniques and technologies from Europe and elsewhere. E-mail to <publications@hotmix.org>, or

through the NAPA home page at <<http://www.hotmix.org>>.

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The new "Pavement Preservation Toolbox," assembled by the Federal Highway Administration and Foundation for Pavement Preservation, contains videos, CD-ROMs, reports, brochures, and other materials that provide a wealth of information on the state of the practice in pavement preservation. From explaining the preventive maintenance concept to selecting roads for preservation to choosing the right treatments, the Toolbox can help get a pavement preservation program underway. To learn more about preservation, contact Julie Truck of FHWA <julie.trunk@fhwa.dot.gov>.

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The National Asphalt Pavement Association has teamed up with the American Road & Transportation Builders Association (ARTBA) to make the single, largest-ever association financial commitment to public education by the construction industry. The two organizations have pledged a combined \$2 million to support a state-of-the-art permanent exhibition called "America on the Move" at the Smithsonian's National Museum of American History in Washington, D.C. The exhibition is scheduled to open in fall 2003.

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As part of an NCHRP-IDEA Project (No. 61), INFRA-SENSE is developing a portable Pavement Thickness Density Meter (PTDM), which will automatically and nondestructively determine pavement thickness

(continued on page 12)

and density at the time of construction. The PTDM uses a horn antenna and specially designed software to safely obtain 100% coverage of the new pavement.

The data is analyzed automatically and results are available on-site. This data will be used to determine compliance with thickness and density specifications at the time of construction. This information could lead to substantial cost savings by enabling agencies to minimize premature and unplanned repairs and rehabilitation costs associated with poor quality construction.

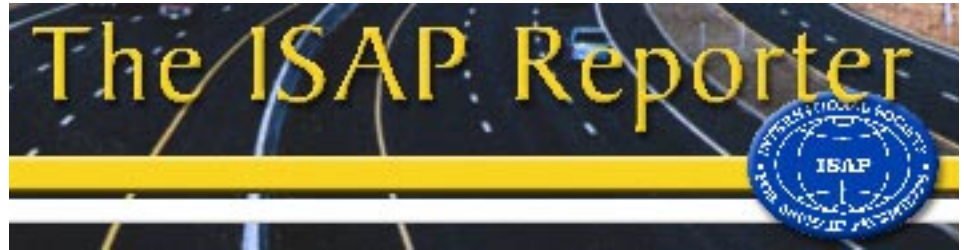
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ASTM has just published Special Technical Publication 1412, "Aggregate Contribution to Hot Mix Asphalt Performance," 2001. Contact: <<http://www.astm.org>>.

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The Asphalt Pavement Alliance (APA) in the United States recently announced the release of a new Interactive CD ROM entitled "What If Roads Could Last a Lifetime?." This multi-media CD-ROM provides a wealth of information about the concept of Perpetual Pavements and the process involved in designing these long-lasting pavements. "What If Roads Could Last a Lifetime" uses video segments, PowerPoint presentations, and voice-over narration to walk the user through the interactive CD,

with information that ranges from the simplest explanation of the potential of Perpetual Pavements, to solid technical information for engineers looking to design their own Perpetual Pavements. To order your copy of "What If Roads Could Last a Lifetime," e-mail request to: <publications@asphaltalliance.com>.



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