

The ISAP Reporter

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Editor: Prithvi (Ken) Kandhal



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ATTEND ISAP'S INTERNATIONAL SYMPOSIUM ON LONG LASTING ASPHALT PAVEMENTS

The National Center for Asphalt Technology (NCAT) will host the International Society for Asphalt Pavement's (ISAP) international symposium on **Design and Construction of Long Lasting Asphalt Pavements** on June 7-9, 2004. The symposium is also sponsored by the U.S. Department of Transportation (Federal Highway Administration), the Alabama Department of Transportation, and the National Asphalt Pavement Association.

The venue of the international symposium is **The Lodge and Conference Center** at Grand National Golf Course in

the Auburn/Opelika area, set in the serene countryside of east Alabama. Auburn is approximately 100 miles southwest of Atlanta, Georgia.

About 40 very good technical papers from many countries concerning long lasting asphalt pavements will be presented in three days at the symposium. Some of the topics are as follows:

- Experience with long lasting pavements in United States, Canada, and Europe
- State-of-the-art review of a proach to long lasting pavements

(continued on page 2)



The Lodge and Conference Center at Grand National Golf Course, the venue of International Symposium on Long Lasting Asphalt Pavements

—International Symposium (continued from page 1)

- Fatigue consideration and foundation requirements for designing long lasting pavements
- Construction and quality control for long lasting pavements
- Stone matrix asphalt (SMA)
- Asphalt pavement warranties in Europe
- Rehabilitation of heavy duty pavements
- Integrated approach to avoid moisture-induced damage
- Evaluation of segregation
- Aggregate resistance to polishing

The tentative schedule of the symposium is as follows:

Sunday, June 6, 2004

Registration, 1-6 pm

Reception, 6-8 pm

Monday, June 7, 2004

Technical sessions, 9 am - 5 pm

Tuesday, June 8, 2004

Technical sessions, 8 am - 5 pm

Dinner, 7-9 pm

Wednesday, June 9, 2004

Technical sessions, 8 am - 5 pm

Dinner

Thursday, June 10, 2004

Optional tour of NCAT research facility and Test Track, 8 am - 12 noon

Exhibits will be open on Sunday through Wednesday.

The following guest program has been planned:

- Tour and luncheon at the Jules Collin Smith Art Museum featuring a 35 ft chandelier crafted by world-famous artist, Dale Chihuly.
- Day trip to Callaway Gardens, featuring the Sibley Horticultural Center followed by a luncheon, then your choice of shopping in nearby Warm Springs, Georgia or a visit to the Roosevelt Little White House.

To obtain a registration pack-

age or questions about the symposium, please call NCAT at 334-844-6228, or email <taplecp@eng.auburn.edu>. Online registration available at www.ncat.us; follow the link to "Upcoming Meetings" on the left.

ISAP CHAIRMAN'S REPORT RELEVANCE AND USEFULNESS

In the search for information concerning criteria to be used in evaluating pavement foundations prior to paving, I came across a report on the practices of different agencies for characterizing subgrade soils during construction. It was somewhat disappointing to find very little information on what minimum stiffness or strength a soil should have prior to building the pavement layers. There was considerable detail on test methods and sampling, yet the critical piece of the puzzle was not to be found. This is a good example of practical information not being useful.

At the other end of the spectrum researchers are furiously trying to develop hypotheses of how top-down cracking occurs in asphalt pavement. Many different potential mechanisms have been identified and some very sophisticated analysis techniques are being brought to bear on the problem. All this effort will be fruitful if guidelines to mitigate top-down cracking result in meaningful changes to materials selection, mix design, testing, and pavement design processes. This would be an example of relevant theoretical work resulting in a useful outcome.

Often times theoretical work is derided as not useful, but practical solutions that have no fundamental basis are applicable only to the conditions

Mark your calendar for June 7-9, 2004! You don't want to miss ISAP's first international symposium on Design and Construction of Long Lasting Asphalt Pavements.

under which they were developed. An example of this is the existing AASHTO flexible pavement performance prediction equation. Originally developed 40 years ago



*David Newcomb,
ISAP Chairman*

from the results of the AASHTO Road Test where 1.1 million load repetitions were applied to flexible pavements with asphalt surfaces up to 150 mm in thickness, this same performance equation is extrapolated to 50 million ESALs for pavements with asphalt layers of 400 mm or more. Clearly, we have gone beyond the conditions of the AASHTO Road Test and it is time for a new approach. In the design of the recent I-710 rehabilitation in California, the design traffic for a 40-year period was estimated to be 200 million ESALs. Carl Monismith and his team employed mechanistic design with a fundamental understanding of fatigue and rutting behavior of asphalt mixtures to provide a useful design process that allowed the construction of a long-life pavement structure. This is an example of theory with a purpose.

In defining our research problem statements, do we really un-

derstand the questions to be answered? We frequently limit innovation by the way we pose problems. For instance, should we define the limit of recycled asphalt allowed in a mix or should we try to find a way to maximize its use? Should we define the minimum temperature and conditions under which we pave or should we develop materials and construction methods to ensure the quality of pavement placed in adverse conditions? Are we focused on developing a new crack growth model or ways to inhibit cracking?

A new model in and of itself does not solve a problem, a new fundamental test does not improve performance, and new technology does not guarantee success in improving a product. It is the end application of these that will define their relevance and usefulness. It is certain that one needs to understand an illness before coming up with a cure, but we must not lose sight that the cure is the important issue, not the definition of the disease.

NEWS FROM NORTH AMERICA

Research on tire/pavement noise is underway at the Institute for Safe, Quiet, and Durable Highways (SQDH) at Purdue University. The institute is the only center in the United States dedicated to research aimed at reducing highway noise while still maintaining and improving the safety, durability, and economics of highways.

The SQDH center has developed a huge Tire/Pavement Test Apparatus (TPTA), which is the only one of its kind in the world for measuring tire/pavement noise. The TPTA is basically a



The Tire/Pavement Test Apparatus at Purdue University's SQDH Center is one of its kind in the world

12-foot-diameter vertical drum on which different types of pavement samples are formed. Two arms with mounted tires on wheels then are "driven" around the drum.

Pavement specimens can be changed while the tire remains constant or the pavement surface type remains constant while the tire design is changed. Measurements can be made on the tire, in the pavement, and with microphones that travel beside the tire.

Details of the research studies undertaken by the SQDH Center are available on their web site at <<http://widget.ecn.purdue.edu/~sqdh>>.

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Maryland State Highway Administration has discovered an innovative method for tracking pavement management and monitoring performance on a long-term basis. This method is based on a Web site and program created by Professor Joe Mahoney and his staff at the University of Washington. The site, HMAView, has been in service since 1998. It was originally populated with 30 Washington State Department of Transportation contracts and now

contains Maryland information as well. This site could archive all project design information, store aggregate and mix design data, assemble construction details, and prepare control charts.

You can view HMAView live by visiting the web site at <<http://hotmix.ce.washington.edu/md>>.

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The Arizona Department of Transportation (ADOT) is undertaking a pilot program to evaluate the use of asphalt rubber friction courses (ARFCs) as a noise mitigation measure. Under Arizona's Quiet Pavement Pilot Program, ADOT will use a 4 dBA (decibel) reduction in their noise evaluation when ARFCs are used. This should reduce the height and length of noise barriers (primarily walls and berms) needed to meet the noise criteria; and in some cases, will eliminate the need for noise barriers entirely. There are other benefits as well. Increasingly, citizens are concerned about the negative effects of higher noise walls and berms—due to the loss of views and shading effects among others.

(continued on page 4)

—News from N. America
(continued from page 3)

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Recent research has indicated that different brands of gyratory compactors may yield different compaction results in spite of having the required 1.25° external gyratory angle. These compaction differences may result in a design air void content difference of up to 1 percent, and a change in asphalt content of up to 0.4 percent. The problem is that different brands or models of compactors have different levels of compliance (give) in their frames. This lack of consistency in compliance is responsible for a difference in the internal angle (inside the mold) where the specimen is being compacted.

In order to address this, a Dynamic Angle Validator (DAV) was developed by Test Quip, Inc. for the Federal Highway Administration. The DAV allows the internal angle of different machines to be checked and subsequently adjusted. AASHTO standards now allow a state agency to choose either external or internal angle calibration. It is recommended that the calibration be done for the internal angle if different brands or models of gyratory compactors are being used. The cost of the DAV is around \$9,000.

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The Asphalt Pavement Alliance (APA) has announced that it is accepting nominations for the prestigious Perpetual Pavement Awards for 2003. Winners will be honored at the APA Asphalt Pavement Conference: 21st Century Construction at the World of Asphalt 2004 Show and Conference in Nashville next

March.

The Perpetual Pavement Award was created to encourage public agencies, contractors, engineers, and pavement owners to build long-life, high-quality pavements which bring more value for the benefit of taxpayers and the public.

To be eligible, a pavement must be at least thirty-five years old and must never have had a structural failure. The pavement must demonstrate the smoothness, quality, and user friendliness of hot mix asphalt pavement. Engineers at the National Center for Asphalt Technology at Auburn University, Alabama, review all nominations. Winners are validated by a panel of industry experts.

Six highway pavement sections in five states and three airport runways received the 2002 Perpetual Pavement Award: Iowa (two sections of I-80); Minnesota (I-35); Missouri (I-44); Oklahoma (I-40); Tennessee (I-65); two runways at Baltimore-Washington International Airport; and one runway at Eareckson Air Station in Alaska.

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The Transportation Research Board (TRB) has a complimentary electronic newsletter, TRB E-Newsletter, which contains sections on TRB publications, TRB news, and other research reports. The E-Newsletter also offers a search engine to search for a news item by keyword or phrase. To find the E-Newsletter online, go to <<http://gulliver.trb.org/news>>.

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The National Cooperative Highway Research Program (NCHRP) is undertaking an important research project, “En-

durance Limit of Hot Mix Asphalt Mixtures to Prevent Fatigue Cracking in Flexible Pavements.” Fatigue cracking originating at the bottom of a hot mix asphalt (HMA) structure has long been acknowledged as the most costly form of distress to correct through rehabilitation.

Performance data from well-constructed flexible pavements with a thick HMA structure, some of which have been in service for more than 40 years, show that bottom-up fatigue cracking does not occur in these pavements. This field experience suggests that an endurance limit, that is, a level of strain below which fatigue damage does not occur for any number of load repetitions, is a valid concept for HMA mixtures; its quantification could aid in the efficient design of long-life flexible pavements with a significantly reduced life cycle cost.

The objectives of this study are to (1) test the hypothesis that there is an endurance limit in the fatigue behavior of HMA mixtures and measure its value



2002 Perpetual Pavement Award winner Interstate 80 in Cedar County, Iowa. The pavement has withstood 40 years of freeze-thaw cycles with flying colors.

for a representative range of HMA mixtures and (2) recommend a procedure to incorporate the effects of the endurance limit into mechanistic pavement design methods.

The \$750,000 research project is expected to begin in March next year and is scheduled for completion in two years.

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The Texas Transportation Institute has developed a Stirred Air-Flow Test (SAFT) to replace the rolling thin-film oven test (RTFOT) and the thin-film oven test (TFOT), which are used to simulate the asphalt binder aging process during HMA production and construction. SAFT uses air blowing to oxidize the asphalt binder. SAFT is faster (testing time of 35 minutes), and its cost is half of the current test equipment. It also eliminates the glass bottles used in RTFOT. SAFT is also suited for testing polymer-modified binders.

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Research conducted at Purdue University for the South Dakota Department of Transportation has concluded that the use of different types of burner fuels in well-maintained and well-tuned HMA plants had no significant effect on HMA mix properties. A small amount of burner fuel residue (less than 35 parts per billion by weight of aggregate) was found in aggregate heated with No. 6 fuel when there was insufficient oxygen available for combustion. The report concludes that mixture contamination is not likely to be a problem when fuels are properly preheated and the plant is in good working order. The report is available from South Dakota DOT,

Office of Research, 700 East Broadway Avenue, Pierre, SD 57501-2586.

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The International Slurry Surfacing Association (ISSA) has recently released their publications **A-105 (Recommended Performance Guidelines for Emulsified Asphalt Slurry Seal)**, and **A-143 (Recommended Performance Guidelines for Micro-Surfacing)**. The new versions are available for free download, on the ISSA website: <<http://www.slurry.org>>.

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The Federal Highway Administration has released the fourth edition of its Distress Identification Manual for the Long-Term Pavement Performance (LTPP) program. The manual provides a common language for describing cracks, potholes, rutting, spalling, and other pavement distresses being monitored by the LTPP program. Pavement types addressed by the manual include asphalt concrete-surfaced, jointed portland cement concrete, and continuously reinforced portland cement concrete.

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Thousands of highway construction specifications from all 50 states, the District of Columbia, and Puerto Rico are now instantly available online at the new National Highway Specifications Web site (www.specs.fhwa.dot.gov). The site is a collaborative effort of the Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO).

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The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Design of Pavement Structures has served as the primary document for the design of new and rehabilitated highway pavements. The guide incorporates empirical design approaches developed from findings of the historic AASHO Road Test of the early 1960s. The Road Test, however, covered a limited range of traffic loading, climatic conditions, subgrade soil, paving materials, and structural features and did not include rehabilitated pavements.

The next generation of design approaches will need to incorporate (continued on page 11)

ISAP AND AAPT CDs AVAILABLE

The following ISAP CDs are available (each CD is \$25 for ISAP members and \$100 for non-members):

- 7th Conference (1992)
- 8th Conference (1997)
- 9th Conference (2002)

The following AAPT CDs are available (each CD is \$25 for AAPT members and \$100 for non-members):

- CD 1 Volumes 48-52 (1979-1983)
- CD 2 Volumes 53-57 (1984-1988)
- CD 3 Volumes 58-62 (1989-1993)
- CD 4 Volumes 63-67 (1994-1998)
- CD 5 Volumes 43A-47 (1975-1978) (NEW)
- CD 6 Volumes 39-43 (1970-1974) (NEW)

NEWS FROM EUROPE

Preparations are underway for the 3rd **Eurasphalt & Eurobitume Congress** to be held on May 12-14, 2004 in Vienna, Austria. The theme of the Congress will be on "practical solutions." The Congress seeks to increase the involvement of road authorities and of research and development specialists.

The Eurasphalt & Eurobitume Congress has been established as the preeminent asphalt and bitumen event for industry in Europe. Four technical sessions will be held in the 3rd Congress as follows:

Technical Session 1: Implementation, Innovative Solutions and Transfer of Technology

Papers have been invited on examples of recent innovative applications and proven practical solutions for the following end uses: roads, airfields, bridges, railways, industrial flooring, hydraulic, leisure, landfill, agricultural, and urban areas. The other subjects are technology transfer, training and education, economics of asphalt pavements, whole life costing and finance.

Technical Session 2: Safety and Environment

Papers have been invited which present safety in the workplace, emissions, classification and labelling, life cycle assessment, sustainability, noise reduction, recycling, risk assessment, contribution to safe driving, leaching, road run-off, and waste classification.

Technical Session 3: Research and Development - Search for New Applications

Papers have been invited on the



The High Speed Deflectograph developed by the Danish Road Directorate

following subjects: new research, new developments and new applications on the following subjects: binders, aggregates, additives, use of secondary materials, hot mixes, cold technique, surface treatments, construction, maintenance, and production.

Technical Session 4: Performance Requirements and Assessments

Papers have been invited which present performance-related specification, performance assessment, functional contracts, regulatory frameworks, developments in CEN standardization, pre-normative research, bitumen quality, quality control, testing, the philosophy of binder and mix specifications, and priorities for research and standardization.

Detailed information on the program, organization, and registration can be seen at <http://www.eecongress.org>.

* * *

The European Committee for Normalisation, or Comité Européen de Normalisation (CEN) is actively preparing a package of harmonized asphalt

standards, which will include a comprehensive set of tests for asphalt mixtures. The standards include both functional (empirical) and rational (fundamental) tests. The procedures are intended to be practical, simple, not too expensive, and not too slow. Many options have been retained in the procedures, which will facilitate rationalization in the future. Specifications together with the associated test methods are due to be published in 2005.

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The Danish Road Directorate and Greenwood Engineering have developed a laser-based equipment to measure the bearing capacity of roads at normal traffic speeds. The new High Speed Deflectograph gives increased traffic safety when measuring bearing capacity and provides a considerably larger basis for planning of pavement maintenance.



NEWS FROM AUSTRALIA

The 12th **International Flexible Pavements Conference** was held successfully in Melbourne on October 5-8. The following topics were covered in the conference: warm asphalt mix advances, performance based standards for local governments, asset management, performance testing and evaluation of bituminous materials, bituminous seals, international developments (Europe), safety and environment (including traffic noise), and asphalt technology advances (stone matrix asphalt, porous asphalt, pavement design, etc.).

The conference related information can be seen at <http://www.aapa.asn.au>.

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An ultra high pressure (UHP) watercutting machine has been developed by New Zealand company Fulton Hogan. The UHP watercutter removes excess bitumen from road surfaces (restoring macrotexture) and increases the microtexture of aggregate particles in the asphalt surface. Both serve to increase the skid resistance of the asphalt surfaces, thereby improving road safety.

NEWS FROM SOUTH AFRICA

Synopses of papers have been received for the 8th **Conference on Asphalt Pavements for Southern Africa (CAPSA)** to be held on September 12-16, 2004 in Sun City, North West Province, South Africa.

The CAPSA five-yearly conferences are premier events in southern Africa, having interna-

tional status for quality and relevance in the highway industry.

Following on from the proud tradition of previous CAPSAs since 1969, the 2004 Conference will focus on four separate themes, each encompassing several sub-topics:

1. **Economic Growth and Development**

- Strategic road initiatives for rural development, urban renewal and poverty alleviation
- Asset management through optimal life cycle costs
- Sustainable employment creation for the provision and maintenance of black top roads

2. **Efficient Road Provision and Maintenance**

- Institutional arrangements and procedures for efficient and effective delivery (roads agencies, public-private partnerships, concessions)
- Equitable sharing of risk through performance contracts

3. **Human Capital Development**

- Current and envisaged education and training schemes and research and development programs
- Broadening the base of participation in the roads industry

4. **Best Practice in Flexible Pavement Design, Construction and Maintenance**

- Studies on the performance of pavements components or systems
- Innovations through the application and implementation of research
- Pavement surveillance and evaluation
- Worker health and safety and environmental conservation

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South Africa's bitumen and bituminous products industry has taken pre-emptive steps to entrench self-regulating policies and guidelines which ensure compliance with international standards of worker health and safety, and environmental conservation.

These initiatives include the establishment of a Centre for Occupational Safety and Health and Environmental Conservation, and an industry-sponsored research project to analyze and classify selected bitumen products for disposal in terms of the Minimum Requirements of the Department of Water Affairs and Forestry.

A significant preliminary finding of the research project is that penetration grade bitumens can safely be de-listed from their current "hazardous materials" category, since they are neither carcinogenic to humans or animals, nor do they threaten negative impact on the environment if disposed of at less stringently controlled landfill sites.

NCAT TEST TRACK READY FOR SECOND CYCLE OF LOADING

The first cycle of loading of the National Center for Asphalt Technology (NCAT) Test Track sections was completed last December. The performance of the test sections after 2-year, 10 million ESALs loading was reported in the May/June issue of the ISAP Reporter.

Construction of the new test sections for second cycle of loading began in May this year.

(continued on page 10)

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
Dec. 2-4, 2003	Asphalt Rubber 2003 Conference	Brasilia, Brazil	<www.consulpav.com>
Jan. 11-15, 2004	83rd Annual Meeting of Transportation Research Board	Washington, DC, USA	<www.trb.org>
Jan. 16-22, 2004	49th Annual Convention of National Asphalt Pavement Association	Phoenix, Arizona, USA	<www.hotmix.org>
Jan. 21-24, 2004	National Pavement Expo	Nashville, Tennessee, USA	<www.pavementonline.com>
Feb. 8-10, 2004	5 th Annual Meeting of the Association of Modified Asphalt Producers	Nashville, Tennessee, USA	email: <amap@sbcglobal.net>
Feb. 25-28, 2004	Annual Meeting of the International Slurry Surfacing Association	San Diego, California, USA	<www.slurry.org>
Mar. 8-10, 2004	Annual Meeting of the Association of Asphalt Paving Technologists	Baton Rouge, Louisiana, USA	<www.asphalttechnology.org>
Mar. 14-18, 2004	8 th International Symposium on Heavy Vehicle Weights and Dimensions	Gauteng, South Africa	<www.8ishvwd.co.za>
Mar. 14-18, 2004	Second Gulf Conference on Roads	Abu Dhabi, United Arab Emirates	<www.gulfroad2004.ae>
Mar. 15-18, 2004	World of Asphalt 2004 Show and Conference	Nashville, Tennessee, USA	<www.worldofasphalt.com>
May 5-8, 2004	5 th Rilem International Conference (Cracking in Pavements)	Limoges, France	http://www.cp2004.unilim.fr cp2004@unilim.fr
May 12-14, 2004	3 rd Eurasphalt & Eurobitume Congress—"Forum for Practical Solutions"	Vienna, Austria	http://www.eecongress.org
June 6-10, 2004	5 th International Symposium on Pavement Surface Characteristics (PIARC)	Toronto, Canada	email: <surf2004@jegel.com>

June 7-9, 2004	International Conference: Design and Construction of Long Lasting Asphalt Pavements	Auburn, Alabama, USA ISAP	< http://www.asphalt.org >
July 6-7, 2004	European Asphalt Technology Association (Inaugural Meeting)	Nottingham, U.K.	email: < marzena.newton@nottingham.ac.uk >
Sep. 12-16, 2004	CAPSA: 8th Conference of Asphalt Pavements for Southern Africa	Sun City, South Africa	< http://www.sabita.co.za >
Sep. 25-29, 2004	Second International Conference on Accelerated Pavement Testing	Minneapolis, Minnesota, USA	< www.cce.umn.edu/engineering/accelerated_pavement >
Oct. 19-24, 2004	6th International Conference on Managing Pavements	Brisbane, Australia	< http://www.icmp6.com >
Oct. 28-31, 2004	3 rd International Symposium on Asphalt Emulsion Technology	Washington, DC, USA	email: < krissoff@aema.org >
Jan. 9-13, 2005	84 th Annual Meeting of Transportation Research Board	Washington, D.C., USA	< http://www.trb.org >
March 7-9, 2005	Annual Meeting of the Association of Asphalt Paving Technologists	Long Beach, California, USA	< www.asphalttechnology.org >
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	< http://www.ntnu.no/forskning/konfover >
Jan. 22-26, 2006	85 th Annual Meeting of Transportation Research Board	Washington, D.C., USA	< http://www.trb.org >
March 2006	Annual Meeting of the Association of Asphalt Paving Technologists	Savannah, Georgia, USA	< www.asphalttechnology.org >
Aug. 12-17, 2006	10th International Conference on Asphalt Pavements (ISAP)	Quebec, Canada	< http://www.ICAP2006.fsq.ulaval.ca >

—NCAT Track

(continued from page 7)

Hot mix asphalt (HMA) was produced and placed in July and August. All construction activities were completed by mid-September.

As shown in the layout plan, the second-cycle test sections can be categorized as follows:

- New eight structural sections N1 through N8 (shown in blue)
- Milling and inlaying of 14 test sections with different HMA mixes for rutting evaluation (shown in red)
- Leaving 24 first-cycle test sections in place to apply additional 10 million ESALs over the next two years (shown in black)

Structural Test Sections

Eight first-cycle test sections (N1 through N8) were milled very deep and reconstructed to facilitate a small, instrumented AASHTO-like structural experiment. As illustrated in the cross-section of the new structural test sections, the two primary variables are as follows:

- Varying HMA thickness. Three total HMA thicknesses of 5, 7, and 9 inches (127, 178, and 229 mm) have been placed over 6 inches (152 mm) of dense crushed aggregate base.
- Asphalt binder type (unmodified versus polymer-modified). Most highway agencies assign the same structural coefficient to all dense-graded HMA regardless of asphalt binder type. Many laboratory studies have shown polymer-modified HMA is stronger and has longer fatigue life compared to conventional HMA. However, this is probably the first time such comparison will be evaluated in

a full-scale field experiment.

The structural test sections also involve two other variables. Stone matrix asphalt is the wearing course in two test sections (N7 and N8), whereas Superpave mix (gradation above the restricted zone or ARZ) has been used as the wearing course in the other six test sections. One test section (N8) has a rich HMA base course with a binder content of optimum plus 0.5 percent. The rich base course has a potential of minimizing the propagation of fatigue cracks from the bottom upwards.

All structural test sections are fully instrumented to measure stress, strain, moisture, and temperature.

Milled and Inlaid Test Sections

Fourteen first-cycle test sections were milled and inlaid with new binder and/or wearing course mixtures to evaluate their resistance to rutting and/or overall performance. The following mix attributes will be evaluated:

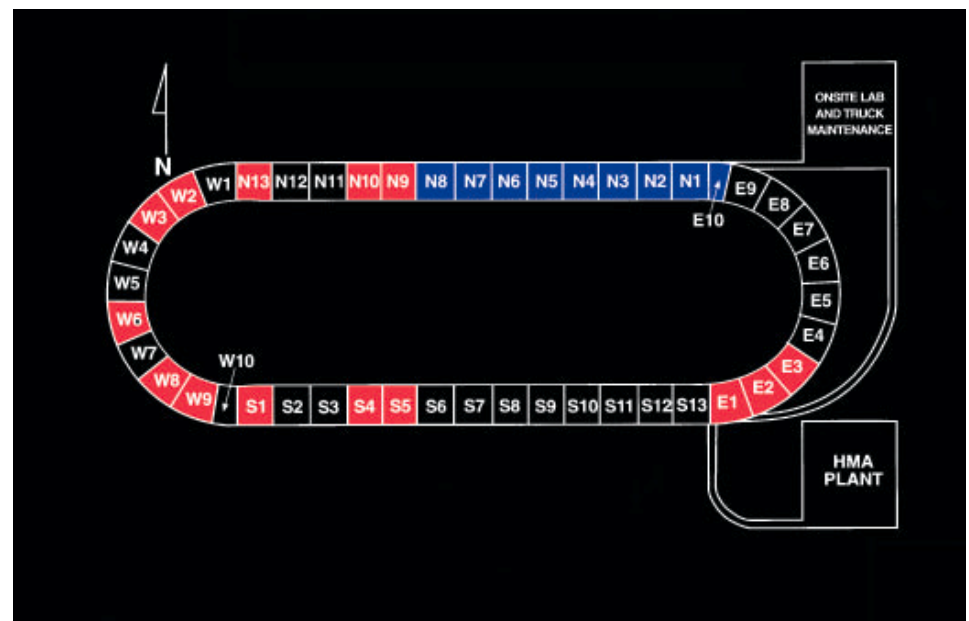
- Superpave and stone matrix asphalt (SMA) mixes containing aggregate with

high Los Angeles abrasion loss.

- SMA mixes with varying aggregate quality: does not meet specifications; border line; and exceeds the specification requirements.
- Fine Superpave mix (4.75 mm nominal maximum aggregate size) for low-volume roads.
- Superpave mix with $N_{\text{design}} = 75$ gyrations (the same mix with $N_{\text{design}} = 125$ gyrations had negligible rutting in the first cycle).
- Thin Superpave mix overlay versus Novachip overlay (both are 25 mm thick and contain the same aggregate).
- Superpave mix containing PG 67 and PG 76 asphalt binders.

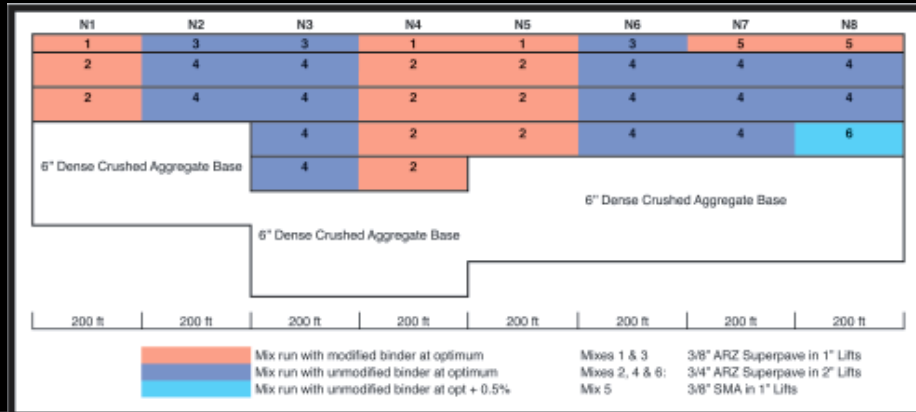
Test Sections for Additional Trafficking

As mentioned in the last issue of the ISAP Reporter, most first-cycle test sections had negligible rutting after 2 year, 10 million ESALs loading. Some state DOTs have decided to keep their test sections in place for additional trafficking of 10 million ESALs. The test sections, which perform well after 20



NCAT Test Track layout showing second-cycle test sections

STRUCTURAL SECTIONS



Cross-section of eight structural test sections

million ESALs loading, will be deemed suitable for very high traffic, interstate highway pavements. The additional trafficking may also better discern performance differences among different mix types (such as Superpave versus SMA) compared to the first cycle.

Test sections for the second cycle of loading have been sponsored by the Federal Highway Administration and ten states: Alabama, Florida, Georgia, Indiana, Mississippi, Missouri,

North Carolina, Oklahoma, South Carolina, and Tennessee.

Trafficking of the second-cycle test sections will begin in October and will continue until 10 million ESALs are applied in about two years (by October 2005). Detailed design and construction details can be seen at the test track web site, <<http://www.pavetrack.com/>>. Performance data will continually be posted on this web site as it is gathered from time to time.



Reconstruction in progress for installing eight structural test sections

—News from North America (continued from page 5)

porate mechanistic principles, because mechanistic-empirical approaches realistically characterize the behavior of in-service pavements and improve the reliability of designs.

In 1998, the National Cooperative Highway Research Program (NCHRP) initiated Project 1-37A to provide the highway community with a guide for the design of new and rehabilitated pavement structures that assembles the best knowledge on pavement design into a single, cohesive package of written guidance and software. Nearing completion, the guide incorporates proven technologies to account for the changes in climate, traffic loading, and material properties during pavement life.

The Guide for Design of New and Rehabilitated Pavement Structures and the accompanying computational software are scheduled for delivery to AASHTO for consideration and adoption this fall.

RESEARCH ON LOW-TEMPERATURE ASPHALT PERFORMANCE IN CANADA

The Ontario Ministry of Transportation (MTO) has undertaken an important research project on asphalt performance in cold weather. Superpave specification system does a reasonable job of predicting the low-temperature performance of conventional asphalt cement. However, it is not true for polymer-modified, chemically-modified, gelled or "engineered" asphalt binders.

(continued on page 12)



Researchers evaluating Highway 118 for low-temperature asphalt performance

Preliminary results from research performed by Queen's University in 2001, on Highway 118 experimental sections (constructed in 1994) near Bracebridge, Ontario, have confirmed that the Superpave grading system is inadequate for predicting low-temperature asphalt performance since some of the test sections have three times the cracking of other sections that are supposedly of the same grade of asphalt.

Queen's University has developed a new test method which

measures the energy that cracks the pavement. This method is able to correctly predict the differences in performance of the various experimental test sections placed on Highway 118.

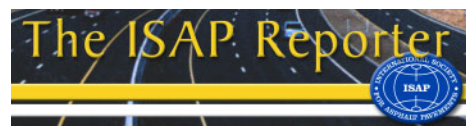
A field experiment is being organized to test and validate the newly developed method and the preliminary findings of this research project. The first field monitoring test results are expected to be available by the summer of 2004. (Road Talk, February 2003).

WORLD OF ASPHALT® SHOW AND CONFERENCE

The 2004 World of Asphalt® Show and Conference will be held in Nashville, Tennessee, USA on Monday through Thursday, March 15-18, 2004. The Asphalt Pavement Alliance sponsored asphalt pavement conference: 21st Centruy Construction will kick off the week's events with two full days of practitioner-oriented technical sessions on March 15-16. The World of Asphalt exhibits will be open Tuesday through Thursday, March 16-18. Concluding the activities will be an open house at a quarry and asphalt plant on the afternoon of Thursday, March 18.

The People, Plants, and Paving Training Program will again be a key educational component of the event in 2004, similar to the 2003 World of Asphalt® Show and Conference, which was an outstanding success.

The World of Asphalt® Show and Conference is a unique educational event for the asphalt industry and for their public-sector customers in the DOTs, cities, counties, etc. It is an umbrella event that includes the Asphalt Pavement Conference; the People, Plants, and Paving Training Program; a Live Paving Demonstration/Open House, and the World of Asphalt Trade Show.



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