CP² Center News

Newsletter of the California Pavement Preservation Center

No # 4 December 2007

Mike Miles is Deputy Director for Maintenance and Operations for the California Department of Transportation. He will also assume the role of overseeing the new Pavements group which is scheduled to be formed in the near future.

Vision of pavements in California

by Mike Miles

Caltrans' long-range plans for pavements on the state highway systems are to make sure the system is in a condition where it will require primarily pavement preservation treatments. This means we need to place preservation treatments on existing highways at the appropriate time to extend its useful life and to preserve our investment, which is currently valued at $1.7 trillion.

The question is how we accomplish this. We need to keep good pavements in good condition with pavement preservation, but we will also have to repair the bad and broken pavements which will be very expensive. A combination of preservation and repair strategies is needed to get where we want to be. We need to convince our decision makers that pavement preservation is the best way to improve the condition of California pavements.

New pavements group – Division of Pavement Management

To help plan and execute this effort, Caltrans will be establishing a new pavements group called the Division of Pavement Management. As Caltrans initiated the planning for this effort, the following activities were undertaken:

- Evaluated the organization of pavement groups in other states. Caltrans liked what it observed in Washington, Wisconsin, and Texas.
- Developed an organization that will include existing pavement components of design and maintenance, and will have work agreements with Materials Engineering and Testing Services (METS) and the divisions supporting Pavement Standards Team.
- Developed a timeline for implementation which is planned for July 2008.
- Identified expected deliverables including establishing a new pavement management system, implementing Mechanistic-Empirical pavement design, and predictive pavement management.
- Established expectations from the group such as better roads and more effective use of resources. The new group will be headed by a chief at the same level as other engineering division chiefs in the Department.

Partnering with others

Caltrans will continue to partner with industry in an effort to make Caltrans a leader in the pavements arena again.

- Partners will include asphalt paving and preservation associations of California, American Concrete Pavement Association, the Federal Highway Administration and local agencies.
- Existing partnering groups will be asked to help in the effort too (Pavement Preservation Task Group, Asphalt Concrete Task Group, and the Portland Cement Concrete Task Group).

Caltrans will need to work with the legislature to obtain stable funding sources to be able to touch at least 7,000 lane miles every six to eight years.

Pavement management efforts

One of the first and biggest efforts will be to develop a robust pavement management system that can provide the needed information to decision makers within Caltrans. The existing system, initially developed in the 70's and modified in the 80's, cannot provide critical information on the performance of various treatments, the cost effectiveness of various maintenance and rehabilitation strategies, or forecast the health of the network under different budget scenarios. To accomplish these goals, Caltrans plans to:

Work with others - Work with other states, nations, and the University of California Pavement Research Center to develop a new pavement management system.

Collect data - All data collection will be accomplished by using vehicles with automated condition-evaluating equipment, and the work will likely be contracted out to vendors. Ride quality, rutting, faulting, and cracking, associated with GPS coordinates, are the major items to be collected. Skid and deflection are for project development only.

Manage data - Data management will be performed by the Office of Pavement Systems in the new division. When fully implemented and data-populated, the new system is expected to provide answers that upper management needs to support needed funding levels, improve the health of the system, and provide pertinent information to technical and legislative groups.

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Quantify the need for preservation- Identify the life of preservation treatments and the extended life of the existing pavement associated with the treatment. We need to be able to place the right treatment on the right road at the right time. Due to limited funds, we often place treatments on pavements as a stop-gap measure instead of extending their useful life by repairing and raising them to a near-new condition.

Ultimate goals of pavements group

Caltrans' long-term vision for the pavements group is simple. We want them to:

- Keep good roads good with proactive pavement preservation.
- Increase the use of long-life or perpetual pavements where the distress is limited to the pavement's wearing surface and is easy to maintain.
- Focus on pavement preservation so we can exist at some time in the future in primarily a preventive maintenance mode.
- We expect the new division to become a national and international leader in the pavements arena, as we once were.

Challenges

This job is not going to be easy. To accomplish these goals, Caltrans needs to:

- Secure stable and increased funding for pavements;
- Deal with the paradigm shift of going from "worst first" to "preserving good pavements";
- Convince the District Directors that pavement preservation is the best solution for optimizing pavements in their districts;
- Implement new technologies to help reduce costs and sustainability efforts;
- Cope with shrinking work windows and increasing amounts of night work;
- Provide for longer and more cost effective, but more costly projects;
- Deal with the negative effects of inflation and construction cost increases; and
- Improve training efforts for all our staff.

Pavement preservation in the City of Los Angeles

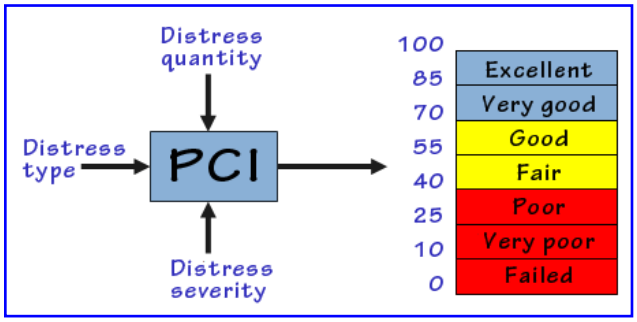
By Nazario Sauceda, Assistant Director
Bureau of Street Services

With a street network comprised of approximately 6,500 centerline miles of streets and 800 centerline miles of alleys, the City of Los Angeles not only has the largest municipal street system in the nation, but also the most congested.

To monitor, maintain, and manage this network, the Bureau of Street Services (BSS) relies on its Pavement Preservation Program which gravitates around a solid and dependable Pavement Management System.

Pavement Management is a systematic, consistent method for selecting maintenance and rehabilitation needs, and for determining the optimal time of repair by predicting future pavement condition. It is a methodology that provides information for maintenance and rehabilitation (M&R) planning, programming and budgeting. Furthermore, it is an analysis tool that provides statistical and historical data and an instrument to support the decision making process.

Figure 1: Pavement Condition Index (PCI)



In addition to its magnitude and heavy congestion, the City of Los Angeles' street network is also one of the oldest in the country. A significant number of streets were originally constructed almost one hundred years ago and approximately fifty percent of the entire street network was built before World War II; consequently, pavement preservation has been a challenge for quite some time and has forced the BSS to consistently go through a "pavement preservation metamorphosis."

Pavement Preservation in the "Good Old Days" included among some other strategies, setting routine maintenance cycles, prioritizing on a "worst first" basis, scheduling work based on "citizen complaints", considering political priority, and following the recommendation from the maintenance superintendent.

However, during the mid-nineties, there was a noticeable need to modernize the Bureau's methodologies by incorporating computers and sophisticated engineering-based knowledge and technologies. In 1998, the Bureau of Street Services adopted the Micro PAVER™ Pavement Management System that allows the selection of the most economical maintenance and rehabilitation strategy for the street system. Projection of future condition requires the ability to measure street condition in an objective, repeatable scale, such as the Pavement Condition Index (PCI). The PCI is a numerical index ranging from 0 for a failed pavement to 100 for a pavement in perfect condition (Fig.1).

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To get the average PCI of the entire street network, the Pavement Management Section of the Bureau of Street Services follows the typical Micro PAVER™ five-step methodology:

Inventory: The City's street network has over 69,000 pavement segments that were inventoried and entered into a computer database.

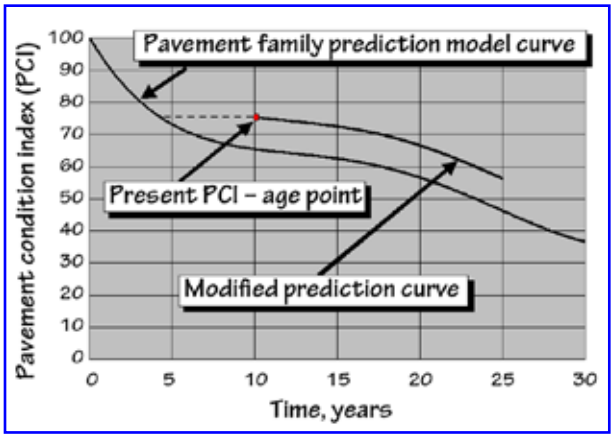
Routing: Prior to performing the survey of the pavement sections, all 69,000 segments were routed manually. Routing of the streets in the network ensures the most time efficient way for the survey teams to capture accurate pavement data.

Survey (Gathering of Data): The BSS currently utilizes two automated vans to collect pavement distress data. Each van is equipped with a computerized work station, cameras to take digital images of the street surface, and lasers to capture roadway roughness and rutting data.

Data Processing: The surface distress information captured by the City vans is processed at a workstation in the office. Laser data and digital images are analyzed using custom software. The distresses on each one of the 69,000 street segments are identified and evaluated for type, quantity and severity. Each segment is equivalent to one city block.

Analysis: The processed information is imported into Micro PAVER™, which analyzes the distress information and calculates a PCI for the pavement. Life Cycle curves are developed and the critical PCI is established. Using the critical PCI, an optimum maintenance/rehabilitation strategy can be developed, budget needs can be determined, and future roadway conditions can be projected based on different budget scenarios (see Figure 2).

Figure 2: Pavement Prediction Curves



With a strong commitment to pavement preservation, the BSS ensures that every single dollar allocated for street maintenance and rehabilitation is intelligently and strategically expended; therefore, the Bureau has focused its attention on determining the optimal time for repair of the streets by predicting future pavement condition. Acknowledging that the current budget allocation is not sufficient to improve the current pavement condition of the street network, the Bureau's pavement preservation strategy has placed an emphasis on "saving" as many streets as possible before they get to the point in their life cycle where it will cost three to five times more to repair them. The Bureau has adopted a "sustainability mode" until the right level of resurfacing funding is available.

The Maintenance and Rehabilitation (M&R) work planning of the BSS is comprised as follows:

Maintenance	Pot hole repairs Crack sealing Slurry sealing
Rehabilitation	Resurfacing Recycling Reconstruction

Crack sealing and Slurry sealing are two operations that take place in a correlated fashion. The annual goal for crack sealing is 100 miles and the goal is generally accomplished while preparing streets that are part of the Slurry Seal Program. A rubberized sealer is used to successfully fill the street cracks. Slurry sealing has been proven to be one of the most efficacious and economical preventive methods to extend the life of the pavements in the City of Los Angeles.

Approximately eight years ago, the BSS set a goal to improve the quality and productivity of the slurry sealing program; the goal also contemplated the reduction of the environmental impact to the community. After testing different options, a pre-mixed rubberized application was determined to be the best solution and the Bureau partnered with Petrochem Marketing, Inc. (PMI) to utilize a slurry seal material produced at a central mix plant and delivered ready for application on the project site. The Slurry Seal Program is accomplished through the use of PMI applicator trucks under the direction and labor work of Bureau forces. While historically, the slurry program was typically funded for 100 miles, the last two fiscal years saw an increase to 300 miles and the current 2007-2008 FY has been augmented to an unprecedented 400 miles.

The use of rubberized slurry seal has proven to be an excellent part of the Bureau's Pavement Preservation Program not only because it provides consistent acceptable test results (improved quality), but also because it eliminates the need for equipment and materials storage in the neighborhoods. Moreover, it reduces the street closing time, and provides neighborhoods with a fresh and clean new appearance that results in increased customer satisfaction.

The BSS' Rehabilitation Program is typically funded for 200 miles per year although during the last decade, the annual resurfaced miles fluctuated from 135 to 270 miles.

Through the use of Micro PAVER™, the BSS has determined that in order to maintain the current average PCI of the street network, it is required to resurface 275 centerline miles every year; consequently, every year that the Bureau is not funded for such mileage, the condition of the street system is negatively impacted. Since the right level of funding is not foreseeable in the near future, the Bureau has proactively adopted a strong recycling program.

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The latest addition to the Bureau's Pavement Preservation Program is the acquisition of the Cold-In-Place Recycling (CIPR) technology (Fig. 3). In 2004, the BSS conducted its first pilot project and immediately it was determined that when CIPR is compared to the conventional methods of street reconstruction, the most noticeable advantages are reduction in the demand for virgin aggregates, reduction of construction time, reduction in truck traffic through city neighborhoods, reduction of environmental impact, and reduction of traffic congestion. All these advantages can be simply summarized in two words: ***cost savings*.**

In times of limited funding, it is always gratifying to know that that the efficiencies generated by incorporating the CIPR technology to the Bureau's Pavement Preservation Program generate enough

Fig. 3 Cold-In-Place recycling machine

savings to pay for an additional ten miles of asphalt overlays. With almost a decade of Pavement Preservation experience, the BSS of the City of Los Angeles has clearly demonstrated that the main benefits of a Pavement Preservation Program are:

- Higher customer satisfaction with the street network,
- Enhanced ability to make better and more intelligent decisions,
- Use of the most appropriate maintenance or rehabilitation techniques,
- Significant improvement of pavement conditions over time, and
- Remarked reduction of the overall costs for maintaining the street network.

Managers and engineers in all levels of government who have adopted a Pavement Preservation Program understand and agree that street management is a matter of "Pay now, or pay much more later".

Pavement preservation research project update

By John Harvey, UC Davis

The University of California Pavement Research Center (UCPRC) is currently completing or has recently completed the following research and development projects of interest for pavement preservation for the California Department of Transportation (Caltrans). This work is managed by the Caltrans Division of Research and Innovation (DRI), with technical guidance provided by the Office of Pavement Preservation and the Pavement Standards Team (PST), who also review all reports before they are published. These projects are part of the Caltrans Pavement Research Road Map. This work is included in Strategic Plan for the Partnered Pavement Research Center (PPRC) contract between Caltrans and the UCPRC.

Assessment of pavement preservation and maintenance treatment performance and cost-effectiveness

The UCPRC is currently nearing completion of several projects related to the performance of pavement preservation and maintenance treatments, and assessment of their cost-effectiveness. These projects are part of PPRC Strategic Plan Element 3.2.5, titled "Documentation of Pavement Performance Data for Pavement Preservation Strategies and Evaluation of Cost-Effectiveness of Such Strategies". Caltrans Maintenance has provided additional funding to help complete this project, which allowed more sections to be included.

The Washington State DOT (WSDOT) has provided their Pavement Management System (PMS) database to the UCPRC, which has been used to develop alligator crack initiation and propagation models for thin asphalt overlays of asphalt pavements. These models have been incorporated into a spreadsheet solution that is currently being reviewed by WSDOT. Reports are being reviewed by Caltrans. These models are also being checked against available performance data from the Caltrans PMS, and will likely require some adjustment for Caltrans conditions and practices.

The UCPRC has developed project histories with help from Caltrans Maintenance and District engineers, and has extracted alligator cracking data from the Caltrans PMS. Project activities include developing a database linking project construction and performance histories, identifying performance probabilities, and calculating life cycle costs. The current status is:

- Completed retrieving project construction histories in early June that required extensive outreach efforts to Districts. Database includes

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718 projects with 11 strategies, mostly Dense Graded AC overlays placed as part of the Caltrans Rehabilitation, CAPM and Maintenance programs, and some chip seals.
- Completed developing probabilities of failure for treatments based on existing cracking (at time of treatment), traffic (high/low), and precipitation (wet/dry).
- Calculation of life cycle costs for extended life benefits is currently underway.
- The final report is scheduled to be complete in November 2007.

Rubberized overlays for rehabilitation and preservation of cracked asphalt pavement

A six-year project titled "Development of Improved Rehabilitation Designs for Reflection Cracking (PPRC Strategic Plan Element 4.10)," is expected to lead to improved rehabilitation and pavement preservation designs for reflection cracking by comparing reflection cracking performance of overlays with terminal blend rubber modified binders, conventional rubberized asphalt binders, and conventional dense-graded asphalt (DGAC). This project includes Heavy Vehicle Simulator (HVS) testing of overlays of cracked asphalt pavement for reflection cracking at moderate temperatures, and HVS testing of the same overlays for rutting performance at high temperatures.

HVS testing for reflection cracking

An extensive laboratory testing program for the mixes has been performed to evaluate stiffness, cracking and rutting performance under a wider range of conditions than were possible in the HVS test sections, and included dense gradations with terminal blend binders. New mechanistic-empirical design models have been developed for predicting reflection cracking performance of overlays placed on cracked pavement, and new methods have been developed for characterizing flexural fatigue beam data that provide a better assessment of the crack propagation resistance of rubberized mixes than do current methods. The current status of the project is:
- All HVS testing, forensic and laboratory investigations and all analyses are completed.
- Final reporting is in progress with Caltrans currently reviewing first-level reports, and second-level analysis reports being completed.
- Recommendations based on the research will be available in a four-page document and a more detailed twenty-page summary report.
- Reports have been going through the Caltrans review and comment process since August 2007.

Pilot project for chip seal specifications adapted from standards and design practices applied by other agencies

UCPRC (PPRC 3.2.8) is developing a proposed California specification for chip seals based on accepted standards used in South Africa, Australia, New Zealand, Texas, and Minnesota. Proposed standards changes for designing and constructing chip seals would help with problems such as raveling and bleeding. Current status:
- The project is roughly 80 percent complete. Information has been gathered from other guides and writing is nearly complete. Consideration of PG binder grades is currently underway.
- The proposed specification will be reviewed by the PPTG Chip Seal Subtask Group as well as the PST.

Support of improved pavement management system for Caltrans

Project activities have been identified for this project (PPRC 3.3) and a work plan submitted to the PST for approval. Status of activities is as follows:
- Discussed background information given previously to Caltrans including recommended PMS data elements, developing baseline pavement structure inventory (using GPR and segmentation), and creating predictive modeling capability.
- Identification of system and IT requirements is currently underway, and information is being gathered for feasibility documents.

Fog seal testing

Project activities include comparing different friction testing devices and conducting field tests of various treatments, organized through the PPTG. This project is funded directly by Caltrans Maintenance. Current status:

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Friction testing using the DFT

Permeability testing

Friction testing using the British Pendulum

- Comparing data from British Pendulum Tester, Dynamic Friction Test, Circular Texture meter, CTM 342 (provided by Caltrans); studying correlation with International Friction Index (IFI); and developing conversion to calculate IFI from CTM 342 data are underway. Studies show good agreement of the IFI values calculated based on measurements from each device.
- Friction was measured by the UCPRC on some field sections during the summer of 2007 and the data is currently being analyzed. The PPTG sub-committee is working to get additional sections ready for testing.
- Participation in PPTG Fog Seal Subtask Group is ongoing.

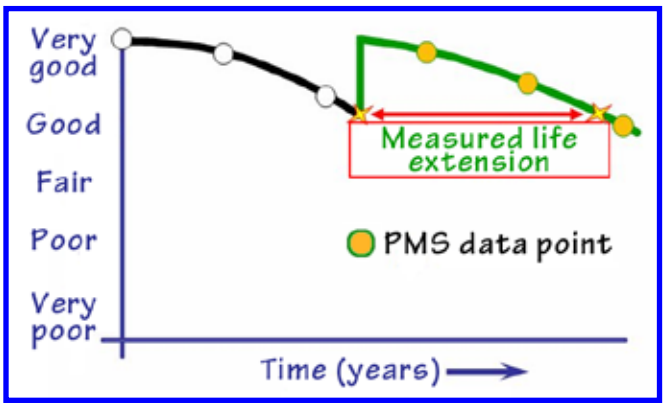
Benefits of pavement preservation

The California Pavement Preservation Center (CP2 Center) and MACTEC are working with the University of California at Davis (UCD) to identify the economic benefits of pavement preservation. The Center and MACTEC are working with local agencies that have an active pavement preservation program and a pavement management system to identify the lives of various pavement preservation treatments. UCD is doing the same for Caltrans and for Washington State DOT. The end result of this effort is to identify the estimated lives and cost of pavement preservation treatments statewide. The PPTG sub-group on strategy selection is also attempting to identify the lives and costs using the experience of industry providers and agencies.

These data will be used to evaluate the cost effectiveness of a proactive pavement preservation program as compared with the rehabilitation strategies currently employed by state and local agencies. The FHWA RealCost program (or equivalent) will be used to determine the savings associated with the use of a proactive pavement preservation program. The end result is to show that pavement preservation can be used successfully to delay rehabilitation or reconstruction. The economic benefits will be reported in savings over a 30-40 year period by using life cycle cost analysis.

Other benefits associated with implementing a pavement preservation program including the following:

Figure 1: Schematic of life extension



Life extension of the existing pavements (delay pavement rehabilitation, see Figure 1). This is an important benefit of pavement preservation to Caltrans. If they can defer pavement rehabilitation or reconstruction by using timely low cost treatments, this will preserve funds for use on other activities.

Lower treatment costs. Pavement preservation treatments typically cost from $1 to $6 per sqare yard while pavement rehabilitation activities can costs as much as $10 to $25 per square yard or more. Pavement reconstruction costs are much higher on the order of $70 to $100 per square yard or more.

Reduced user costs. Keeping good roads in good condition have been shown to reduce annual user costs by as much as $500 to $700 per year. This means the roads are smoother with fewer potholes to cause damage and wear to vehicles.

Improved safety. Use of pavement preservation treatments allows the contractor to get in and get out fast minimizing the opportunities for work accidents during long work periods.

Improved overall network health. By keeping good roads in good condition and finding ways to plan repairs for pavements in need of rehabilitation and reconstruction, some agencies have shown the overall network health can improve.

Environmental benefits of pavement preservation treatments such as reduced air pollution and noise and increased sustainability.

To fully realize the above benefits, Caltrans and others need better information to convince the Transportation Commission and the Legislature to provide more dedicated funding for pavement preservation and additional funds to repair pavements that are beyond the preservation stage. Work being done at the Center (in cooperation with MACTEC) and at UC Davis is designed to provide better information to demonstrate the benefits of pavement preservation.

Certificate program in pavement preservation

Students enrolling in the certificate program in pavement preservation will be able to work at their own pace on the web.

The California Pavement Preservation Center will offer a 12 unit graduate level certificate in pavement preservation. The first course offering in the pavement preservation graduate certificate program will be CIVL 698 and is planned to begin in spring semester 2008. The course titled, "Strategies for Selecting Pavement Preservation Techniques", is a one semester unit, Web based offering. The course is a graduate level course and is intended for graduates in Civil Engineering or Construction Management. Others with appropriate backgrounds in related areas may take the course. Eleven additional one unit courses will be offered in subsequent semesters and will need to be completed to attain the certificate.

The course examines strategies for selecting pavements for preventive maintenance and selecting the appropriate treatments for those pavements. The course covers such topics as the identification of pavement conditions and other factors that suggest that preventive maintenance is appropriate for a given pavement, to identify feasible treatments for a given pavement, and to select the most appropriate treatment for a pavement. This course's target audience is maintenance engineers, planners, and field personnel in highway and public works agencies. There will be two web based exams as part of the course. Each student will be required to produce a Term Pavement Preservation Paper. Students will be required to review papers by other students and receive constructive comments on their paper prior to submitting a final paper.

The course instructor is Mary Stroup Gardiner, formerly a Professor at Auburn University in Civil Engineering. Dr. Gardiner will begin her new position as a Senior Pavement Preservation Engineer at the Center on January 2, 2008. The course was developed by Dennis Gier, a registered civil engineer and member of the CSU, Chico Construction Management faculty.

Students enrolling in the course will be able to work at their own pace on the Web. The course will begin on January 28 and end May 23, 2008. For instructions to enroll in the course contact Linda Farrell at lfarrell@csuchico.edu or Tom Ferrara, at tferrara@csuchico.edu. Most off campus students will enroll through the Regional and Continuing Education Open University program. The fee for the one unit course is $175. Students need to complete the enrollment process by February 1. Contact and initiation of paperwork should start two weeks earlier.

Upcoming pavement preservation events

PPTG All Members workshop, December 4, 2007, City of Industry, CA. For all presentations check out the PPTG website www.cp2info.org/taskgroup.

Annual meeting of the Transportation Research Board, January 13-17, 2008, Washington DC. For information on registration, check out the TRB meeting website http://www.trb.org/meeting/.

Annual CCSA Pavement Preservation conference, January 24-25, 2008. Sacramento, CA. www.chipseal.org.

National Asphalt Paving Association, January 27-30, 2008, Phoenix AZ. For more information on registration, check out the website http://www.hotmix.org/.

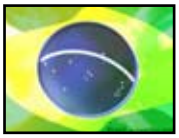
AEMA-ARRA-ISSA Joint Meeting, February 20-23, 2008, San Jose el Cabo, Mexico.

PCCAS spring meeting, March 4, 2008, Reno NV. www.pccas.org.

County Engineers Association of California. PWOI Spring conference, March 5-7, 2008, San Diego CA. www.ceaccounties.org/.

Annual California Pavement Preservation Conference, April 9-10, 2008. For registration information check out the conference website www.cp2info.org/conference.

Brazilians visit Caltrans on the use of asphalt rubber



September 26-27, 2007

Purpose of meeting

A group of Brazilians, representing industry and agencies, visited California Department of Transportation (Caltrans) on September 26-27, 2007, to find out more about the use of asphalt rubber in the United States. The group was headed up by Marcos Greca who owns several asphalt rubber terminal blend plants in Brazil and Delmar Salomon, President of Pavement Preservation Systems LLC based in Boise Idaho, who coordinated meeting activities for the Brazilians.

Shakir Shatnawi of Caltrans was the host for the visit and provided the Brazilians an overview of asphalt rubber use in California. He was assisted in his presentation by Haiping Zhou and Andrew Brigg of MACTEC who described some of the work they have done for the California Integrated Waste Management Board (CIWMB) for Caltrans and local agencies and by Dr. Gary Hicks of California Pavement Preservation Center who gave a brief presentation on the Asphalt Rubber Usage Guides developed for Caltrans and the CIWMB.

Brazilians with Shakir Shatnawi at Caltrans Translab facility

Caltrans overview of asphalt rubber practice

Shakir Shatnawi's overview of Caltrans' use of asphalt rubber included a discussion of the mandate described in California Assembly Bill 338. He stressed that California uses primarily the wet process in which coarse Crumb Rubber Modifier (CRM) is mixed with the asphalt binder, extender oil and high natural rubber. Caltrans has been using this product since the 1970's in chip seals and thin hot mix overlays. Caltrans has experimented with the terminal blends using products with up to 15% CRM with good results.

Local agencies have also followed Caltrans lead and use not only the wet process, but also terminal blends in which the CRM is at a reduced load level (less than 10 % CRM). The CIWMB continues to provide grants for encouraging other local agencies to use asphalt rubber in hot mixes and will provide similar grants for chip seals in the future.

Brazilian experience with CRM

The Brazilians use terminal blends at the present time for all asphalt rubber applications. The CRM content is reportedly higher than the terminal blend binders used in the United States. The performance of the products placed reportedly has been good. The wet process that is widely used in California and Arizona is not used in Brazil.

Field trips

Gary Hildebrand of SemMaterials and industry co-chair of the PPTG led a trip on the afternoon of the 26th to several sites in the Sacramento area including projects at:

- Arden Way and Howe Avenue in Sacramento, an older Rubberized Asphalt Concrete Type-G project placed to reduce noise.
- Sacramento Highway 99, a Rubberized Asphalt Concrete Type-O project constructed in 1999. The project was placed over badly deteriorated portland cement concrete and is still performing today. It was supposed to be a RAC-O-HB, which would have likely performed even better.

Jack Van Kirk of Basic Resources, Inc., took the Brazilians to several other projects on the morning of September 27, 2007. Projects visited include the following:

- Two RAC-G projects on I-80 near Davis. These projects were thin overlays over PCC and were 9 to 10 years old. Overall the projects are performing well with the only distress being the result of PCC blowouts at the edge of the pavement and in the outside truck lane at a few locations.
- An AR cape seal in West Sacramento near the Port of Sacramento was visited. This project was 2 years old and in good condition with no distress. This project has an extremely high amount of truck traffic associated with Port activities.

Brazilian practices compared to Caltrans

The Brazilians have been using terminal blend binders where Caltrans has been experimenting with terminal blends, but mainly uses the wet process. The binder contents with the terminal blends tend to be lower than that used in the wet process. If the CRM content is increased to produce a product similar to the field blend wet process (in terms of the amount of CRM in the binder), it is likely the performance of the two products will be different.

Center news

Mary Stroup Gardiner

Mary Stroup Gardiner will join the staff at the Center in January 2008. Dr. Gardiner comes to us from Auburn University where she served as a Professor of Civil Engineering. She received her Bachelors (1985) and Masters (1987) degrees at the University of Nevada, Reno, where she worked with Dr. Jon Epps. She moved onto the University of Minnesota where she received her PhD under the direction of Dr. David Newcomb in 1997. She joined the faculty at Auburn University in January 1997 advancing from Assistant to Full Professor in her tenure there.

Mary has extensive experience in pavement materials, including the use of polymer modified asphalts performance related specifications, use of innovative technologies for quality control, pavement preservation and management, portland cement concrete, relationships between pavement material types and pavement noise

She has been active in professional groups including ASCE, ASTM, TRB, AAPT and ASEE. She has won numerous awards including honorary membership from ASTM committee D4, best paper award from AAPT in 2000, and outstanding civil engineering faculty in 2000. We are delighted to have her join the Center staff to work as a Senior Pavement Preservation Engineer.

Denny Gier

Denny Gier joined the Center in the Fall of 2007. He is currently an Associate Professor in the Construction Management Department at CSU, Chico, where he teaches construction estimating and construction cost management. Prior to joining the Faculty at CSU, Chico, Denny was a full time faculty member at Cal Poly, San Luis Obispo, teaching in the areas of contract administration, construction materials, and construction estimating. He has experience in developing and delivering training to Caltrans. He is well qualified to develop and deliver web-based training. He has been working on the development and delivery of an online course entitled, "Strategies for Selecting Pavement Preservation Techniques" for the spring of 2008. Denny is a Registered Professional Civil Engineer. He has also worked with the Corps of Engineers as the Chief of the Quality Assurance Branch, and as a Project Manager on various construction projects, including highways and airports. We are fortunate to have someone with Denny's background preparing web-based training for the California Pavement Preservation Center.

Tom Carter and Ding Cheng

Ding Cheng, an assistant professor in civil engineering, is teaching the first asphalt class at CSU, Chico, offered in a few decades. Ding received his PhD in asphalt pavements from Texas A & M University and prior to joining CSU, Chico, worked for Parsons Brinkerhoff, Inc. in Houston Texas. He has involved several PPTG members in his asphalt class including Hans Ho, Tom Carter, Roger Smith, Skip Brown, Dan Haynosch, Jack Van Kirk, and Brandon Milar. The practical lessons that the PPTG brings to the classroom has been very valuable to the students. We are working with industry to add an asphalt lab to the Center.

Skip Brown

FHWA expert task group on pavement preservation meets in Seattle

Gary Hicks

Gary Hicks of the CP2 Center participated in meetings on October 29-30, 2007, in Seattle, Wash., to discuss progress on a number of pavement preservation issues. The group, headed up by Jim Sorenson of FHWA and Dennis Jackson representing industry went over a number of issues, including the following;

- Research activities.
- Pavement preservation-acceptance and implementation.
- Update on the pavement preservation Centers and regional pavement preservation organizations.
- Training needs and certification of contractors.

Jim Sorenson

They also spent time to updating their strategic plan.

Published quarterly by the California Pavement Preservation Center
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