



CP² CENTER NEWS

Newsletter of the California Pavement Preservation Center

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The 2007 California Pavement Preservation Conference Union City, California · April 11-12, 2007

The 2007 California Pavement Preservation Conference (CP2 Conference) was held April 11-12 in Union City, California. Nearly 350 representatives from local, regional, state and federal agencies, industry and academia attended, representing a total of 141 different organizations. Participants shared their considerable expertise and wide-ranging experience in the areas of pavement preservation for both flexible and rigid pavements. More than 30 exhibitors were on hand to share their knowledge of specific pavement preservation treatments and techniques.

The Union City conference in April was well attended.



A well-executed, systematic pavement preservation program that utilizes timely, appropriate, and successive preservation treatments will have the cumulative effect of postponing costly rehabilitation, preventing the need for reconstruction and improving overall pavement condition system-wide. This conference demonstrated the benefits of such a program; stressed the importance of using a Pavement Management System for inventory; capture of work history, deterioration modeling, needs assessment, and budgetary planning; and introduced the full-spectrum of pavement preservation strategies.

Steve Takigawa, Chief of Caltrans' Division of Maintenance and a vocal proponent for pavement preservation, challenged attendees to identify three things learned at the conference, and apply those three things in their daily work. The final measure of the conference's success will be the attendees' application of the knowledge gained and lessons learned from conference presentations to improve roadway conditions.



Steve Takigawa urged conference participants to apply good practices learned at the conference to their daily work.

Michael Miles, Deputy Director of Caltrans' Maintenance and Operations, encouraged individuals to use creative ways to keep their "good roads good" by applying new and innovative processes and treatments. Caltrans is actively working toward the goal of reducing the total number of distressed lane miles statewide and pavement preservation is an integral part of this effort.



Michael Miles

Jim Sorenson, Office of Asset Management for the FHWA, reminded the audience that the investment in highways exceeds \$2 trillion and we must protect and preserve this investment, just as we would for our personal automobiles and houses. The ISTEA bill of 1992 initiated the pavement preservation effort, and we have come a long way since. We must treat the right road at the right time with the right treatment, resisting the urge to treat the worst pavements first.

The remaining speakers delivered presentations on a variety of pavement preservation topics. The speakers included **Shakir Shatnawi**, **Cathrina Barros**, **Kirsten Stahl** and **Ric Maggenti** of Caltrans; **Steve Mueller**, and **Jason Dietz** of FHWA; **Gary Hicks** of the California Pavement Preservation Center; **Bill O'Leary** of the Foundation for Pavement Preservation; **Laura Melendy** of the CA-LTAP/Technology Transfer Program; **Phil Demery**, **Scott McGolpin**, **Theresa Romell**, **Tom Borman**, **George Bradley**, **Erik Updyke**, and **Jerry Dankbar** representing local and regional agencies; and **Joe Ririe**, **Scott Dmytrow**, **Jim Towns**, **Scott Metcalf**, **Lowell Parkison**, **Bob McCrea**, **Jim Brownridge**, **Skip Brown**, **Jeff Smith**, **Don Matthews**, **John Roberts**, **Gary Hildebrand**, and **Casey Holloway** from industry.

Presented by the California Pavement Preservation Task Group, this conference was made possible through the cooperative efforts of the California Local Technical Assistance Program, the California Pavement Preservation Center, the California Department of Transportation, the Federal Highway Administration, and the Maintenance Superintendents Association.

The agenda, presentations and contact information for the 2007 conference is posted on the conference website at www.cp2info.org/conference.

Planning is underway for the 2008 California Pavement Preservation Conference. When date, location and registration information become available, they also will be posted at the above conference website.

National update

By Jim Moulthrop
Foundation for Pavement Preservation

Traditionally, transportation agencies have allowed the condition of their pavements to deteriorate to a fair to poor condition before taking any measures to return them to a good to excellent condition. The conditions generally measured are ride quality and type and level of distress. By waiting until rehabilitation is required, returning the pavement to an acceptable condition is both expensive and time consuming, interrupting the flow of traffic, inconveniencing the traveling public and business owners.

Some agencies, however, have discovered that by applying a reasonably low cost treatment to pavements earlier in their life they can save money and increase the service life. A higher quality pavement with longer life, a happier traveling public, and judicious use of taxpayer funds result. Figure 1 is a plot of condition versus time, which points out the benefits of applying a treatment early in the life of a pavement.

The Federal Highway Administration has devoted a significant effort over the past ten years to encourage agencies to develop a robust preservation program.

FHWA has funded the publication of numerous documents including CDs, pocket guides, and sponsored the Pavement Preservation Ex-

pert Task Group. Additionally, they have advocated, along with the Foundation for Pavement Preservation (PP2), the development of regional Preservation Centers. The National Center for Pavement Preservation (NCP2) at Michigan State University is currently reviewing state DOT Preservation Programs and serving as a Pavement Preservation Help Desk for AASHTO, joined by new centers in Texas and California.

Although preservation relates to both flexible and rigid pavements, a significant amount of the treatments used are bituminous products. Most of these products have been used in the United States and Internationally for years but little research has been conducted to either improve the existing techniques or identify new and innovative approaches. Recently the FHWA sponsored two workshops to identify research needs in the preservation program area with the goal being to obtain funding to support the most critical areas.

Recently the Road Information Program (TRIP) and the NCP2 published a booklet entitled "At the Crossroads: Preserving our Highway Investment" which describes the condition of the nation's highways and presents a compelling message about the importance of an effective preservation program.

MTAG for rigid pavements

Background

The first edition of MTAG for rigid pavements was developed in 2006 and was reviewed by the Pavement Preservation Task Group (PPTG) and the Caltrans Pavement Standards Team (PST). All comments were provided to Caltrans in early 2007. A draft of the second edition of MTAG for rigid pavements is currently being finalized. It will be posted on the Caltrans website www.dot.ca.gov/hq/maint/MTA_Guide.htm.



Scope of document

The MTAG includes chapters on the following topics

- Introduction to pavement preservation and materials used in pavement preservation treatments
- Desirable Surface characteristics (ride, noise, and safety)
- Strategy Selection
- Joint resealing and crack sealing
- Diamond grinding
- Dowel bar retrofit
- Isolated partial depth repair
- Full depth repair and slab replacement

The document provides detailed information on the design, materials, construction and specifications for the various treatments. It also provides information on field testing, troubleshooting problems and check lists for inspectors.

Expected benefits

The benefits to come from the use of the guide are more informed users and producers of the various preservation treatments and ultimately improved performance of the various treatments. The MTAG for flexible pavements has proved to be a valuable resource and provides technical assistance to the district maintenance engineers and others. It will be supported by training and will be updated periodically to reflect changes in processes and specifications.

Training survey

The CP2 Center, in cooperation with the Pavement Preservation Task Group (PPTG) has developed a survey to identify training needs in the pavement preservation arena. The survey form can be found on the Center website (www.cp2info.org/center). After completing the survey, responses will be automatically summarized. Please assist us by completing the survey so that your training needs can be addressed. If you have questions about responding to the survey, please contact Paul Lowe at the Center (paul@tetra vista.net).

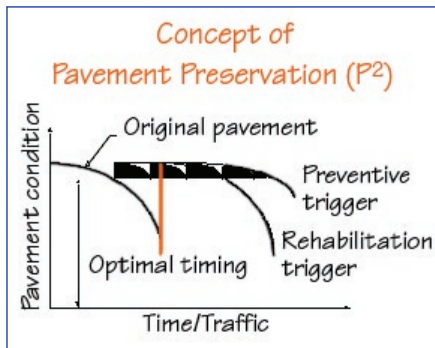


Figure 1. The Pavement Preservation P² Concept

Experiences with RAC-O-HB projects in California



Reflective cracking from a slab on I-5.



RAC-O-HB in the traveled ways and a conventional mix on the shoulder on SAC 99.

Background

Rubberized asphalt concrete (RAC) is a material produced for hot mix applications by mixing asphalt rubber with graded aggregate. RAC-O indicates that asphalt rubber is mixed with open-graded aggregate; RAC-O-HB indicates that asphalt rubber is mixed with open-graded aggregate, but with higher binder content.

The primary differences between RAC-O and RAC-O-HB are the features or functions they provide.

RAC-O provides a durable, highly flexible pavement surface with enhanced drainage and frictional characteristics. It reduces splash and spray to improve visibility during wet weather, reduces hydroplaning in wet conditions lessening the potential for skidding. It provides increased resistance

to reflective cracking and oxidation, and provides a smooth ride.

RAC-O-HB is used mainly to restore surface friction and provide improved resistance to fatigue and reflective cracking, as well as to stripping and oxidative aging. These features increase the durability of the pavements.

The other difference is the binder content. RAC-O is designed using the California Test 368 with asphalt

rubber binder content set at 1.2 times the optimum neat asphalt binder content with a check test for drain off. RAC-O-HB is designed according to the RAC-O procedure, but the multiplier for asphalt rubber binder content is increased to 1.65. Generally, RAC-O-HB mixes have at least 8.5 % binder by weight of the dry aggregate.

RAC-O-HB mix offers many benefits to the user. It can provide the following attributes:

- Noise reduction over concrete pavements. This has been proven in the state of Arizona.
- Improved durability and resistance to reflection cracking. However, when placed over badly distressed pavement, surface preparation work must be undertaken.

Performance of RAC-O-HB Projects in California

Several projects have been constructed with RAC-O-HB mixes in California and they have performed extremely well. A summary of the projects is given in Table 1.

Table 1 Summary of RAC-O-HB Projects in California

Project	PM	Lane miles	Date const	Range in binder contents, %
SAC 99	21.6-24.6	3 miles	1999	7.0-8.2
FRE I-5	0-38	165	2000	8.5-10
MONO 395	76.0-84.5	8.5 miles	2000	8.5-10.0
MONO 395	106.3-108.0	1.7 miles	2000	8.5-10.0
SBD 40	3-15	112	2002	8.5-10.0
SBD 40	73.4-89.5	112	2002	8.5-10.0

CIWMB Project

The California Integrated Waste Management Board (CIWMB) has awarded CP2 Center a research project to provide continuing education training to professionals and develop curricula on RAC and other CE applications of waste tire for universities. The funded project will last two years from June 2007 to May 2009.

California has more than 40 million waste tires generated each year and millions of waste tires have been illegally dumped or stockpiled. There is a potential to use large quantities of waste tires in rubberized asphalt concrete (RAC) in highway projects, and other civil engineering (CE) applications such as levee slurry walls,



slope stabilization, and light weight fills. To maximize the usage of waste tires, this CIWMB project focuses on teaching civil engineers, students and others involved in engineering projects the knowledge of using waste tires in roads, fills and other applications. There are two major educational products for this project:

1. Develop and deliver continuing education workshops for engineers and technicians involved in using waste tires in RAC and in other CE applications; and
2. Develop teaching modules about RAC and CE applications of waste tire, and offer these teaching curricula to all applicable universities in California.

A pavement preservation program reaps rewards in Santa Barbara County

Modified from original source: Public Works Magazine

Background

Santa Barbara County has successfully implemented a pavement preservation program to improve the current pavement network health. They shifted their efforts from fixing the worst first to keeping good roads in good condition first.

In the days when state gas tax revenues were adequate to subsidize road repair and construction, it was commonplace to defer roadway repair until it was time for complete reconstruction. However, state funding policies changed drastically in the

1980s and '90s. The county was fortunate that in 1989 its voters approved a local ballot measure increasing its sales tax by a half-cent and those incremental funds were earmarked for transportation improvements.

The local funds from Measure D allowed Santa Barbara County to develop a program for surface-

treating the roads. By the 1990s, however, those treatments had shown deterioration and needed additional attention. The public works department then developed a plan to maintain the system on a preventive basis. Santa Barbara County is now reaping the rewards (and awards) from a pavement preservation program it launched six years ago.

A strategic plan

In 1999, county transportation officials unveiled the Road Maintenance Annual Plan (or RdMAP), a comprehensive analysis and maintenance plan to prevent widespread deterioration of its roadway infrastructure. The plan was created from a state-of-the-art inventory of its roadways, assessing the pavement condition (pavement condition index, or PCI) from 100 to 0, best to worst, with the help of the use of MicroPAVER Pavement Management System (PMS) developed by the U.S. Army Corps of Engineers. Combined with a geographic information system (GIS), the department can plan,

maintain, and analyze the county's pavement network. The system allows the county to evaluate inventory, select the roadway that needs treatment, forecast budgets, and communicate plans and infrastructure needs to its residents and decision-makers.

The county's plan introduced a strategy to prioritize funding to protect its best quality roadways first, while failing roads are prioritized for rehabilitation using remaining funding. The public works department anticipated the need to over-communicate this new operational strategy to elected officials and constituents. Once the plan was properly communicated, public involvement and awareness of local infrastructure issues increased. With accountability came confidence, and elected officials and their constituents responded favorably.

Using new technologies

Another important lesson learned was the need to think "out of the box," bringing new maintenance strategies to the table due to dwindling funding sources. For preserving its best roads first, this meant exploring a variety of sealers and rejuvenators.

More than two-thirds of the county's roadways are now in the pavement preservation mode, up from 45% in 1999.

The county continues to explore new technologies that provide lower cost options to balance ever-escalating oil and paving costs. It initiated the Scrub Seal with a Micro-Surfacing Cap project in 2005 on a series of deteriorated roadways which resulted in significant savings compared with other strategies.

For more information on the pavement preservation program used in Santa Barbara County, please contact Scott McGolpin (Director of Public Works) smcGolp@cosb.net, or Kevin Donnelly, Project Manager for the county's transportation division kdonnel@cosbpw.net.



The finished product is a combination of a scrub seal, which acts as a stress-absorbing membrane, and a micro-surface placed on top.

Photos on this page: Santa Barbara County Public Works, Transportation Division



A scrub seal is being applied into the road surface with a scrub broom specifically designed for this process.

PPTG accomplishments & success stories

By Shakir Shatnawi

What is the PPTG?

The pavement preservation task group (PPTG) is a partnered platform consisting of members from Caltrans, industry, local agencies, Federal Highway Administration, and academia. The PPTG was formed to provide a level playing field for all groups working in the State on pavement preservation issues. It is currently managed by co-chairs representing Caltrans (Shakir Shatnawi), industry (Gary Hildebrand for flexible pavements and Casey Holloway for rigid pavements), and George Bradley of the City of Lodi representing local agencies. A total of 22 subtask groups define the makeup of the PPTG. The Charter and the makeup of the various committees can be found on the task group website www.cp2info.org/taskgroup. A detailed summary of the following accomplishments at the Union City Conference is posted at www.cp2info.org/conference.

Selected Accomplishments

The PPTG has been active in several areas dealing with pavement preservation including the following;

- Planning and conducting the annual pavement preservation conferences
- Development of an innovation process to be followed in evaluating new pavement preservation technologies. Several products are being evaluated including RAC-O-HB, European quiet mix, microsurfacing, surface recycling and warm mixes.
- Development of non-standard special provisions (NSSP's) for numerous products. and evaluating them on full scale field projects
- Development of the Maintenance Technical Advisory Guide (MTAG) for flexible and rigid pavements. New chapters on recycling and interlayers will be included in the next version of the MTAG for flexible pavements.

Caltrans Technical Fact Sheets

Caltrans Division of Maintenance will be developing technical fact sheets on a number of the products used in the state. The first fact sheet is on fog and rejuvenating seals. The information contained in these brief documents includes a description of the product, when and where they should be used, the products and specifications used by Caltrans, safety factors to consider when using the products and key references. All fact sheets will be placed on the Caltrans and the CP2 Center websites.

- Development of training modules for the MTAG. A standard template has been established for all groups to follow.
- Development of treatment selection guides for both flexible and rigid pavements and estimated lives for treatments and the associated life extension. Cost effectiveness analysis will be part of the final procedure to be recommended.
- Establishing test sites to evaluate asphalt rubber chips seals, interlayers, and fog and rejuvenating seals
- Serving as an advisory board to the CP2 Center.



Shakir Shatnawi

Members of the PPTG at the Union City Conference.



Gary Hildebrand (left) and Casey Holloway



George Bradley

Summary

The PPTG was formed to improve the process of introducing new innovations and specifications. The partnership between Caltrans, industry and local agencies is working. Much has been accomplished, but much more needs to be done.

Patrons update

The Center is actively recruiting patrons to help support activities not funded under the Caltrans contract. These include items such as:

- Funds for on-campus education programs
- Scholarships for undergraduate and graduate students
- Provide internship opportunities for students
- Provide intellectual expertise (guest lecturer, to facilitate field trips)
- Fund equipment (lab and field testing) and facilities
- R & D monies-special projects

We are appreciative of all the support to date and look forward to adding to our list of supporters. If you are interesting in helping, please contact Jerry Hight at jhight@csuchico.edu.



Jerry Hight



Upcoming Pavement Preservation Events

National conference on pavement management, May 6-9, 2007, Norfolk VA, www.cpe.vt.edu/pavementmanagement07/.
Caltrans Recycling workshop District 3, June 6-7, 2007, Sacramento, CA.
Seventh National Conference on Asset Management, November 6-8, 2007, New Orleans, LA, Sponsored by TRB and FHWA.
AEMA workshops on emulsions, November 7-8, 2007, in Las Vegas and December 5-6 in the City of Industry. For detailed information visit www.aema.org.

California Chip Seal Association meeting. Scheduled for January 24-25, 2008, in Sacramento CA. For more information, visit www.chipseal.org.
ARRA workshops on recycling. Planned for winter 2008. For more information visit www.ara.org.
California Pavement Preservation Conference planned for April 2008, in Southern California. More information: www.CP2info.org/conference.
ARRB Sprayed Coating Conference, July 27-29, 2008, Adelaide, South Australia. Information can be found at www.arrb.com.au/ss08.

Center News



Linda Farrell

We would like to welcome **Linda Farrell** to the CP2 Center team. She joined us on April 1, 2007 as our administrative support coordinator. Linda comes from the Department of Civil Engineering where she worked as office manager for six years. We are delighted to have her on our team.



Paul Lowe

Paul Lowe is currently serving the Center as the webmaster. Paul is a senior in Electrical and Computer Engineering and will be with us until he graduates in 2008. He is currently working on the training survey and helping answer computer questions for the staff.



Tom Ferrara

Tom Ferrara, Director of the Center, has been with Chico State since the early 1970's. He served as the Civil Engineering Department head and retired from the department five years ago. Since then he has been working half time teaching and helping with other department related activities and serving the Center since January 2007.

Gary Hicks joined the Center in February 2007 as the Technical Director. He retired from Oregon State University in 1997 after 25 years of service. He moved to Chico in 2000 and worked with MACTEC until January 2007.



Gary Hicks

Professor Ding Cheng, Department of Civil Engineering, is active with the Center in providing assistance in the areas of online training support, continuing education and technical assistance on several other Center-related projects.



Ding Cheng

Willo Oswald



Willo Oswald produces the Center's newsletter. Willo worked for many years in the corporate communications department of Willamette Industries as a graphic designer/desktop publisher.

The Center is currently interviewing candidates for two pavement preservation engineer positions. We hope to have these positions filled very soon.

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