



CP² CENTER NEWS

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Randy Iwasaki

Interview with Randy Iwasaki

Randell "Randy" Iwasaki is the Director of the California Department of Transportation (Caltrans). Iwasaki was appointed by Governor Schwarzenegger in August, 2009, and is in charge of the operation of the California state transportation system, including more than 50,000 lane miles of state highway, intercity passenger rail, state support for local mass transportation systems, 12,400 bridges and more than 250 general aviation airports. He oversees an annual budget of almost \$14 billion and a staff of more than 21,000 maintenance, planning, right of way, environmental, administrative, and engineering personnel. A licensed civil engineer, Iwasaki has been with Caltrans for more than 26 years serving in a number of high profile engineering and management positions.

From November 2004 to August 2009, Iwasaki served in an appointed position as the Department's Chief Deputy Director. During his Caltrans career, Iwasaki has spearheaded a number of transportation engineering innovations in California including the use of old tires in rubberized asphalt, the installation of LED red lights saving the state taxpayers more than \$2 million a year in power costs, and conversion of the Caltrans equipment fleet to clean burning fuels.

Iwasaki also serves on a number of national transportation panels. The panels include chairing the Technology Coordinating Committee for the renewal portion of the Strategic Highway Research Program and AASHTO's Special Committee on Transportation Security and Emergency Management. He is the past chairman of ITS America.

In 2009, he was named to the Government Technology's list of 25 "Doers, Dreamers and Drivers," and in 2008 was the recipient of the Thomas H. McDonald Memorial Award, which is considered the highest award presented by the American Association of State Highway and Transportation Officials for "rendering continuous outstanding service over an extended period of time or have made some exceptional contribution to the art and science of highway engineering."

Iwasaki earned his bachelor's degree in Engineering from California Polytechnic State University, San Luis Obispo, and a master's degree in Engineering from California State University, Fresno.

You have been the Director since July 1, 2009. What have been the highlights/challenges of your short tenure?

Caltrans has been extremely successful in moving projects forward through American Recovery and Reinvestment Act (Recovery Act) funding. California leads the nation with \$2.47 billion in Recovery Act funding obligated to 898 highway and local street transportation projects statewide. More than \$1.46 billion in Recovery Act dollars is for pavement projects. Although the Recovery Act has helped the state's economy by moving projects forward sooner than later, the funding is a one-time shot. The state must face the challenge of funding transportation projects, including pavement preservation.

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Caltrans is gearing up for a possible second stimulus with the requirement that contracts must be executed within 90 days. We are looking for ways to fast track the project delivery process so we can take advantage of this opportunity to help build the economy and fix more roads in the state.

A major highlight has also been to push the Department into asset management and life cycle costing. We feel this is the direction the Department needs to move in order to preserve our infrastructure in the most cost effective way.

On the challenge side, Caltrans calculates that it will take \$5 – \$6 billion annually to properly rehabilitate the roads. We are only able to fund approximately \$1.5 billion per year. New funding sources must be secured to maintain our state's roadways. As a result, our biggest challenge has been finding a stable source of funding to keep up with our needs. "Our projects create jobs which is part of the solution for the economic downturn we are currently going through".

Funding for highway projects is expected to continue to decline. What strategies will Caltrans follow to maintain its infrastructure? Finally, how can we help convince the public that maintaining good highways is important?

A strong pavement preservation program makes economic sense. For every dollar spent on pavement preservation, the department will save five dollars in future maintenance work. According to a white paper published by the California Pavement Preservation (CP²) Center for Caltrans, a proactive preservation program is expected to result in savings of up to 50% in the SHOPP. This means billions of dollars over the next 30 years. California highways carry more than 45 % of the goods transported around the country, and it is important to maintain and protect this investment.

Caltrans will continue to protect our roadway system through pavement preservation and innovation in pavement engineering. Over the past several years, Caltrans has used innovative technology in our construction projects including:

- Warm-mix test sections
- Asphalt rubber and terminal blend chip seal test sections
- Fog and rejuvenating seal test sections
- Cold in-place recycling projects
- Rubberized asphalt concrete open-graded high binder

The CP² Center is a partner in our efforts. Through its outreach efforts (newsletters, tech briefs, reports, etc), the Center can help Caltrans get the word out and educate the public on the importance of supporting funding for transportation projects.

Pavement preservation efforts continue to grow in California. Caltrans has been a recognized leader in this effort and has won a national award for the efforts. How do you see Caltrans, industry and academia continuing this momentum?

It was certainly a privilege and honor for the Department to win the 2009 James B. Sorenson Excellence in Pavement Preservation Award in recognition of its vision, dedication and commitment reflected in an outstanding pavement preservation program. This national recognition is a reflection of a great, joint effort performed by our industry partners, including the Center. It was especially gratifying to win because Jim Sorenson was a close friend of mine. No one person had a greater impact on asset management than he did. Caltrans will continue to explore

and identify new areas of cooperation and increase the level of involvement of each partner.

The Center has been in existence for three years and has helped elevate the importance of pavement preservation throughout the state. Are there other things you would like to see the Center accomplish during the next three years?

For the last three years, the Center has done a great job supporting Caltrans on the pavement preservation program in many ways. In the next three years, I would like to see the Center continue to support Caltrans by:

- expanding its training and education on pavement preservation,
- encouraging innovation and new technologies in pavement preservation,
- providing technical assistance on pavement preservation issues,
- providing technical support to the Pavement Preservation Task Group (PPTG), and
- promoting effective pavement preservation practices.

I also expect that the Center will continue the effort of outreach to other agencies and industry partners for additional support.

"A strong pavement preservation program makes economic sense. For every dollar spent on pavement preservation, the department will save five dollars in future maintenance work."



2009 cold recycling on California highways – the pilot project process works

by Donald Matthews, Pavement Recycling; Chuck Valentine, Valentine Surfacing Co.
Darren Coughlin, Coughlin Construction

Often a new roadway construction technology is not readily accepted by a contracting agency due to perceived failures with the first few projects constructed. These “failures” are often a result of the agency’s lack of experience and poorly defined expectations among the parties involved as opposed to problems with the technology itself. In an attempt to successfully implement new pavement strategies and develop consistent expectations, Caltrans developed a pilot project process through the Pavement Preservation Task Group (PPTG). This pilot project process is intended to prevent hasty conclusions and provide all “new” technologies an opportunity to succeed.

Nothing illustrates the success of the process better than the five CIR contracts that were constructed by the State in 2009 (Table 1). Four different gen-

post-construction reviews by the appropriate PPTG Subtask group is a significant means for ensuring ultimate success of a technology.

The importance of good communication and good JITT is clearly illustrated in the three District 6 recycling contracts. The three contracts for District 6 were all on State Route 33 in Kern County. The three separate contracts ran in series, immediately adjacent to each other. The first CIR contract let, 06-0J4404, was also District 6’s first attempt at cold recycling. This was the middle segment of the three projects on SR 33. The project called for four inches of CIR followed by a HMA overlay in some areas and a chip seal in other areas. As part of the mix design process, core samples were gathered by W. Jaxon Baker, the prime contractor, and sent to Asphalt Pavement and Recycling Technology (APART) to conduct the mix design in accordance

Table 1 – Caltrans CIR contracts FY 09/10

Contract	Location	Prime contractor	Recycling contractor	CIR depth	Square yards
06-0K6904	Kern SR 33 MP 40.3/45.5	Granite Construction Co.	Pavement Recycling Systems, Inc.	4-inches	79,000
06-0J4404	Kern SR-33 MP 45.5/54.8	W. Jaxon Baker, Inc.	Valentine Surfacing Co.	4-inches	136,056
06-0F7404	Kern SR 33 MP 54.8/59.0	Granite Construction Co.	Pavement Recycling Systems, Inc.	4-inches	63,702
09-336604	Mono SR 108 MP 9.8/15.1	Sierra Nevada Construction	Coughlin Company, Inc.	4-inches	83,200
02-1E9804	Plumas SR 36 MP 12.3/14.0	Knife River Construction	Pavement Recycling Systems, Inc.	4-inches	42,342

eral contractors utilizing three different recycling subcontractors constructed these five CIR projects in three different districts. All five CIR projects were ultimately deemed a success, however, one of them experienced significant problems. In addition, valuable lessons resulting in the continuing improvement of the CIR specification was the result of all of them. The most

significant one is that the Caltrans pilot project process calling for Just in Time Training (JITT) and

with the project specifications. The mix design called for 3.5% Pass R emulsified recycling agent from Western Emulsions, Inc. as the starting emulsion rate. As it turned out, due to the logistics of the project, this project was the only one of the five CIR projects in the State not to conduct JITT. This also turned out to be the CIR project that experienced the most problems. Early on in the recycle operation on SR 33, the recycling subcontractor, Valentine Surfacing, recommended a reduction in the amount of emulsified recycling agent based upon the initial laydown performance and appearance. This reduction was discussed among the prime contractor and Caltrans and it was agreed to reduce the emulsion content to 3% to remain within the +/- 0.5% recommendation of the mix design. However, after reducing the emulsion content to 3.0% the recycled material continued to appear to Valentine to be on the rich side and concerns were voiced about the stability of the mix when the weather in that area increased.



CIR train on SR 108



Before and after construction on SR 36

The daytime temperatures at the time of the recycling were mostly in the 70° and 80° F range with a few days reaching the 90° F level. Further discussions were held but it was decided to remain at the 3.0% emulsion rate with a concern about veering too far from the mix de-

sign recommendation.

After the roadway was recycled, it was allowed to cure and was released to temporary traffic. During the curing period, temperatures in the area continued to climb into the high 90° F range. At intersections on the project, heavy truck traffic turning loads on to and off of the recycled pavement resulted in rutting and shoving of the cold recycled material. Isolated repairs had to be made to those areas and the project was eventually overlaid and chip sealed.

Granite Construction with Pavement Recycling Systems, Inc. as the subcontractor constructed the other two CIR projects on SR 33. In these two sections of roadway, JITT was conducted with all the parties beginning the project with a good understanding of the expectations. These two projects utilized the same emulsified recycling agent and the same laboratory completed the mix designs. However, for these projects, the design emulsion content was reduced to 2.5% with one of the projects necessitating the emulsion to be reduced to 2.3% in some

areas. These two projects were completed at both ends of the recycled section of SR 33 without experiencing any shoving at the intersections and truck access points.

District 2's CIR project on SR 36 in Plumas County, 02-1E9804, proved challenging in a different way with respect to the distress of the existing pavement and the existing grades at intersections. However, good JITT provided all parties the clear understanding and the means and measures to handle the project challenges, especially at the difficult turnouts and abrupt stopping grades. General contractor, Knife River Construction and its subcontractor, Pavement Recycling Systems, Inc., made quick work in cold in-place recycling the approximate 42,000-sy project at four inches deep and constructing the 0.15-foot HMA overlay.

Finally, the District 9 SR108 Sonora Junction CIR project, 09-336604, built by Sierra Nevada Construction as the general and Coughlin Construction Company as the recycling contractor proved again the value of good communication and defined expectations. This 7,000 feet elevation Mono County project consisted of 5.5 miles of four-inch CIR with the roadway expanded from 24-feet to 26-feet during the recycling process. A final two-inch HMA overlay was used as the surface seal. The experiences gained by District 9 as relayed during the post-construction review with the PPTG Recycling Subtask Group, resulted in some significant refinements to the CIR specification. By fully implementing the pilot project process, the CIR pilot projects completed in 2009, and the resulting experiences gained by Caltrans provide the State with confidence as it prepares to embark on an aggressive recycling initiative to make the CIR strategy commonplace Statewide.



NOTE: [User: "chair" logged in as "pptg_chair"]

Search User Profiles
 Search Innovations
 Browse Innovations
 Browse User Profiles
 Edit Account
 Logout

1. Please state innovation proposal status: [\[Help \]](#)

proposal

2. Please state approval condition: [\[Help \]](#)

Approval for funding in this fiscal year

Select email recipients from list
Press Ctrl and Left Click to select/unselect multiple
Select NONE if you do not want to send email.

Enter your email here ...

Submitter

Chair

Center_Staff

Innovation_Review

Binders

Chip_Seals

Crack_Seals

Diamond_Grinding

Dowel_Bar

FOG_Rejuvenator_Seals

Innovation

Interlayer

Local_Agencies

Committee C

Partial_Full_Depth_Repair

Pavement_Management

Email templates for PPTG Chair

Distribute innovation for review

Request additional information from submitter

Approve preproposal/proposal/final report

Approve proposal funding condition

Save and Send Email

The Caltrans innovative database has been improved

By Joe Holland, Caltrans and Ding Cheng, CP² Center

The purpose of the developed innovation database is to streamline the process for implementing innovation and new products in the areas of pavement preservation and to encourage technical transfer through dissemination of information through the website.

Version one of the innovation database was developed by the innovation subgroup and the CP² Center. Caltrans' new innovation projects, such as RAC-O-HB, Interlayer, Fog and Rejuvenation Seal, Chip Seal, Warm Mix, European quiet pavement, Hot In-Place recycling are being stored in the database.

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To increase the productivity of the program, new features have been added to the program which include the following:

For pavement preservation innovators and champions:

- “My Innovations” button was created for innovators or champions so that only innovations created or belonging to the innovator or champion will be shown when this button is selected. This will help innovators or champions to quickly find their innovations without going through a long list of all innovations.
- The innovation submission form was redesigned to include three separate forms. The original form has 25 questions which seemed too much for an innovator or champion to fill out. The redesigned form has a separate form for each submission stage such as pre-proposal, proposal, and final report. An innovator or champion is only required to fill out each form at a set time in the process and has less than 10 questions. This will simplify and clarify the innovation submitter’s work.

For innovation reviewers and committee members:

- To ensure a reviewer’s comment is entered properly, the reviewer has to select the “I agree to make this comment publicly viewable” option.
- When a reviewer or committee member receives an email from a Caltrans PPTG chair about reviewing an innovation project, a direct link to the project is included in the email message. By clicking on the link, the innovation project can be directly opened and viewed by the reviewer or committee member after the user logs in.

For PPTG Caltrans Chairs:

- A PPTG Caltrans chair can approve an innovation project with different funding options. The options include ‘Approval for funding this fiscal year’, ‘Approval with funding by district’, and ‘Approval, but no funds available’.
- A chair can select people to whom an email notification will be sent. A list is available including innovation submitter, PPTG chairs, PPTG subgroups, and CP² Center staff.
- Several email templates have been created for the PPTG Caltrans chair including ‘Distribute innovation for review’, ‘Request additional information from submitter’, ‘Approve Pre-proposal/Proposal/Final Report’, and ‘Approve proposal funding condition’. By selecting these email options, automatic email messages will be generated and appear in the email message text box. The PPTG Caltrans chair can then finalize the message and send it.

All users can edit their own accounts after they log in to the innovation database except as a guest user. This will help users to update their contact information by themselves. The link of the database is www.cp2info.org/center/innovation_database.

The future work plan is to connect the innovation database with the CP² Center Pavement Preservation Treatment Database (PPTDB). The PPTDB stores the construction history, annual or more frequently pavement condition surveys including photos of the pavement preservation projects. By providing the direct linkage, one can view an innovation project in the PPTDB by one click on the innovation inside the innovation database. If you have any questions or comments about the innovation database or PPTDB, please contact Dr. Ding Cheng at dxcheng@csuchico.edu.



Corona includes residents and businesses in pavement preservation projects

By Nelson D. Nelson, City of Corona Department of Public Works

Repairing or reconstructing city streets is always a challenge. Getting the impacted businesses and residents to act as the project’s champion is even more difficult. However, the City of Corona is striving to do just that. City staff has learned that getting strong support for street improvement projects from those directly impacted by the work prior to construction makes it significantly easier to complete the project and minimizes change orders.

Preserving local streets requires the support of community businesses and residents for funding and to endure the actual construction. Corona’s City Council also recognizes the difficult economic times confronted by many businesses and wants to ensure that the City’s efforts to repair and maintain the road infrastructure do not negatively impact

its businesses or residents. Therefore the Department of Public Works was challenged to make the necessary repairs while ensuring that access to businesses and homes was adequately provided. Construction projects completed during 2008 and 2009 indicate the City has successfully developed a plan to comply with Council’s high standards by implementing a program that incorporates partnering and transparency.

Utilizing the City’s website, Public Works provides constituents and businesses with current information about upcoming projects, projects under construction, and a summary of those most recently completed. Each project includes a brief description of the work to be performed and a map showing

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Taber Road, before and after improvements



the limits of the project. Completed projects have a one-page summary that includes the final cost of the project followed by several “before” and “after” pictures to visually demonstrate the benefits of the project.

Most significantly though, prior to even advertising the project, City staff makes an extended effort to personally notify every business of the future construction project and actively seek their advice and suggestions to help make the project fully successful. This outreach serves several beneficial purposes. By approaching these businesses early in the design phase, valuable feedback and ideas are provided by local business people who identify critical issues that could affect their establishment. These owners and managers often provide creative ideas or suggestions that can readily be incorporated into the plans and specifications. This exchange of information educates everyone about the scope of the project and creates an awareness of the construction process. By incorporating specific comments and recommendations into the project, the City gains the support of these businesses while accommodating their most crucial needs.

Contractors bid on the project with a clear understanding of how the work must proceed including any specific time or date restrictions. The competitive bid process ensures that the City gets the best price to complete the work while the partnering effort with local businesses makes certain the work proceeds exactly as planned. The effort to include businesses prior to construction and throughout the construction period have proven beneficial to all parties as the contractors are able to develop the most cost effective approach to complete the work while simultaneously accommodating the needs of adjacent businesses. Change orders and extra costs have also been minimized because the contractors can complete the work according to the approved plans and specifications.

Corona’s 2008 Street Rehabilitation Project incorporated more than 70 lane miles utilizing Rubberized Emulsion Aggregate Slurry (REAS), local pavement repair or a grind and overlay application. A significant portion

of this project encompassed an industrial park that could not afford the loss of business due to construction. The extra effort to inform businesses of the construction schedule and accommodate deliveries or special events was noted by company owners and managers who shared their appreciation with the City.

Three large projects were completed in 2009 that included two major street rehabilitation projects and one significant local street rehabilitation project. The Local Street Rehab Project consisted of 59 lane miles in residential neighborhoods and five City Park parking lots. The material selected was a Tire Rubber Modified Slurry Seal (TRMSS) that was used for the first time in the City of Corona. This material proved to be a fast drying application that allowed the streets to be closed for only a short period of time, typically between 7 AM and 3 PM weekdays.

Residents were notified of the one-day road closure through three different fliers distributed by the contractor. The first flier was circulated to all residents when the project first started. A second notice was provided to specific residents one week prior to their street being resurfaced. Then a third notice was delivered 48 hours prior to the day their street would be closed. Special accommodations were provided to those constituents who required access to and from their homes during construction. This outreach kept residents informed of the work and minimized complaints. In fact, several residents called the City to provide positive comments about the schedule and product.

Two 2009 major street rehabilitation projects encompassed nearly 18-lane miles utilizing a variety of treatments that included local pavement repairs, REAS, grinding and an AC overlay for the entire road width, and full depth reclamation. As experienced before, an extensive effort was again made prior to preparing the specifications to con-

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Project Completion Summary

- **Project Title:** SAMPSON AVENUE PAVEMENT REHABILITATION
Project No. 25-1008
- **Location:** Sampson Avenue from Radio Road to easterly City limit
- **Description:** The 2.5 mile project consisted of replacing deteriorated curb & gutters, driveway approaches, installing ADA compliant curb ramps, striping and pavement rehabilitation treatment including slurry seal, grind & overlay, and full depth reclamation. This project will help maintain the integrity of the road, extend the useful life of the pavement, and increase public safety.
- **Schedule:** Construction started September 2009 and was completed in November 2009.
- **Project Cost:** \$846,869.96
- **Funding:** Prop. 1B and Measure A

tact those businesses impacted by the work. These business owners and managers provided positive support of the project by actively communicating with City staff before and during construction. A Tweeter website was even created to help keep interested parties informed about the progress of the construction throughout the project. The active participation of these local businesses helped ensure that these major street rehab projects were completed expeditiously while still maintaining access for their customers.

Sampson Avenue pavement rehabilitation project: full depth reclamation.

Although construction of a street rehabilitation project often means inconvenience and disruption

to daily routines, the positive feedback provided by constituents and business owners during construction is a strong indication that the effort extended to include these key players in the process is well worthwhile.

For more information contact Nelson D. Nelson, nelson.nelson@ci.corona.ca.us



Sampson Avenue pavement rehabilitation project: before and after treatment



Sutter County switches from HMA overlays to cape seals as primary maintenance strategy

By: Neal Hay, PE, Public Works, Sutter County and Russ Wenham, PE, OMNI-MEANS, Ltd.



Severely alligator cracked pavement in the community of Sutter. This location received a PME 3/-8" chip with micro-surfacing

If you go back more than a decade, Sutter County used to place seal coats to maintain their 780 miles of county roads. However, for the last ten years, the strategy most often selected for roadway maintenance was a two-inch AC overlay. The result was that relatively few miles of roadways received a maintenance treatment each year and

the backlog of distressed pavements continued to grow.

If the last ten years were the "overlay decade," then

2009 was the "year of the cape seals." And for year 2010, another round of cape seals are planned for construction. The bottom line was that the County needed to stretch its pavement preservation budget and begin the transition from worst-first to preventative maintenance. Cape seals are one tool that will help the County achieve its goals.

As a starting place for selecting roadways for treatment, the County used its MicroPAVER Pavement Management System program to identify roadway segments for evaluation. The County contracted with OMNI-MEANS Engineering to develop treatment strategies for the roadway segments identified by the PMS. The strategies ultimately selected were:

- Grinder digouts and crack sealing as preparation for seal coats
- Cape seal: PME chip Seal with microsurfacing
- Cape seal: Rejuvenating scrub seal with microsurfacing
- Microsurfacing only

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Placement of a flush coat on Bogue Road. The flush coat actually increased rock fly, so flush coat work was eliminated from subsequent locations

Grinder digouts: In preparation for seal coats, County maintenance forces replaced the AC surfacing at locations with severe structural failure. These locations had severely aged AC, alligator cracking and rutting.

Crack sealing: The locations identified for crack sealing received a hot-applied Type 3 sealant in accordance with Caltrans standards. The contractor opted to use Crafcro Polyflex as the crack sealant. Two weeks prior to placing sealant, the contractor was required to spray herbicide in cracks to kill weeds and then remove the dead weeds and debris before placing the sealant. The cost for this item was \$3,700 per lane mile.

PME chip seal: A polymer modified asphaltic emulsion (Grade PMCRS-2h) was selected for the chip seals with 3/8-inch maximum screenings. In preparation for the chip seals, the contractor was required to trim any low hanging branches from adjacent trees, remove all pavement delineation, remove weeds and perform pick-up brooming. Since the AC surfaces were heavily cracked and aged, the emulsion application rate was fairly high (between 0.38 and 0.42 gallons per sq.yd.) and the screenings rate also was on the high side at approximately 30 pounds per sq. yd. Chip seals were placed on approximately 12.3 centerline miles of road or 191,000 square yards. In the weeks prior to placement of the microsurfacing, there wasn't any evidence of flushing and rock retention was excellent. The unit cost for the chip seal was \$1.55 per sq. yd. (including traffic control).

Rejuvenating scrub seal: Latex polymer modified rejuvenating emulsion with Medium/Fine (5/16-inch maximum) screenings were specified for the scrub seal locations. The contractor elected to use PASS CR for the emulsion. The scrub seal was placed on approximately 1.5 centerline miles (29,000 square yards) of residential subdivision streets. The same

as with the chip seal locations; the contractor was required to perform tree trimming, weed removal and sweeping. The AC surfaces had moderate to heavy alligator cracking, thus the emulsion application rate was on the high side (approximately 0.40 gallons per sq. yd.) and the screenings were placed at approximately 25 pounds per sq. yd. Rock retention was excellent and no flushing was evident prior to placement of the microsurfacing. The unit cost of the scrub seal was \$1.40/sq. yd. (including traffic control).

Flush coat: The specifications called for the placement of a grade CQS1 asphaltic emulsion fog seal over the PME chip seal. The flush coat was specified to minimize "rock fly" and dust in the days following placement of the chips. In actuality, it turned out that the stickiness of the CQS1 resulted in *more* rock fly, rather than less. The flush coat was eliminated after the second day's application in favor of good sweeping to control the dust and rock fly. The unit cost of the flush coat was \$0.14 per sq. yd. (including traffic control).

Microsurfacing: A polymer modified cationic microsurfacing emulsion with Type II aggregate was used as the top seal coat over the chip and scrub seal locations – resulting in a Cape Seal. When placed over the 3/8-inch chip seal locations, the application rate was approximately 20 pounds of dry aggregate per sq. yd. When placed over the smaller aggregate in the scrub seal locations, the application rate was approximately 15 pounds of dry aggregate per sq. yd. In addition to placing microsurfacing over the chip and scrub seal locations, there was an additional 1.3 centerline miles (22,000 square yards) of residential subdivision streets that only received a microsurfacing treatment. The unit cost of the microsurfacing was \$2.90 per sq. yd. (including traffic control and pavement delineation).

Quality control testing: The specifications placed the responsibility for daily quality control testing on the contractor, Intermountain Slurry Seal. In general, the contractor was required to collect two sets of samples on a daily basis for both emulsion and aggregate. One sample set was delivered to the contractor's AASHTO certified laboratory for a battery of tests with the second sample delivered to the engineer. The specifications contained various pay factors that could be applied if materials were found to be out of specification, however, the contractor met the specifications for the project and received full pay.

Lessons learned

1. Construction timing – The County took a calculated risk and put the job out late in the season with bids opening in August. Fortunately, the contractor wanted to "get-in and get-out," and the weather was cooperative, resulting in completion of the work in October, 2009. The days were short

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Severe transverse block cracking on Central Street in the community of Meridian. In the future, the County intends to do more AC pavement repair and crack sealing prior to placing seal coats over locations like this



Workers place micro-surfacing over scrub seal on a residential subdivision street

and temperatures cooler, thus some days the contractor couldn't begin placing material until late morning. Additionally, after the sun goes down, micro-surfacing doesn't harden very quickly so the contractor had to stop placing material at about 2:30 p.m. in the residential neighborhoods. In 2010, the County will put their projects out earlier in the season.

2. Minimizing rock fly – Placement of a flush coat didn't provide the intended results. However, making multiple sweeping passes on the day of the seal coat work and at least one time per day for five days following gave good results.

3. More preparatory work – Not all transverse and longitudinal block cracking was cleaned and sealed prior to placing the seal coats. Watching seal coat material line the inside of, but not fill, existing cracks on roadways that did not get crack treatment demonstrated the value of prepping the area before placing the seal coats.

For more information, contact Neal Hay at 530-822-4402, nhay@co.sutter.ca.us, or Russ Wenham at 530-242-1700, rwenham@omnimeans.com.



Providing incentives for pavement preservation strategies in the San Francisco Bay Area

By Theresa Romell, Metropolitan Transportation Commission

In order to make the case for better funding of street and road maintenance, local jurisdictions and transportation agencies must also be able to demonstrate that proper maintenance strategies are being employed with the resources that are currently available. Coinciding with the more regular use of pavement management systems and wider knowledge of pavement life cycles and associated treatment costs, the concept of pavement preservation has begun to take root within public works agencies. In the Bay Area, local governments' employment of pavement preservation strategies has helped the region to maintain average pavement conditions despite the ever-decreasing availability of maintenance funding. This article describes how the Metropolitan Transportation Commission (MTC) has assisted in the effort to improve maintenance strategies through the promotion of pavement preservation concepts, and the setting of performance standards connected to the distribution of regional funding.

MTC is the transportation planning and financing agency for the nine-county San Francisco Bay Area. Over the last twenty years, MTC has developed a transportation asset management program geared for the local street and road network. MTC's Regional Street and Road Program (RSRP) provides local governments with technological tools, training, support, funding, and advocacy, to help preserve and improve the region's existing local street and road network.

A major component of the RSRP includes the development and distribution of the pavement management system software StreetSaver®. The impetus for creating StreetSaver® came from a need to

know the condition of local streets and roads for transportation planning purposes, and also to answer the question, "If I don't have enough money to fix everything, what should I fix first?" All 109 local jurisdictions in the Bay Area use StreetSaver®, which means MTC can easily gauge pavement conditions and maintenance performance region-wide, and can use that information to condition regional funding on how well jurisdictions adhere to cost-effective maintenance strategies.

Pavement preservation concepts have always been at the heart of StreetSaver®. The software utilizes a cost-effective analysis to recommend pavement sections for treatment. The cost-effectiveness ratio is a function of projected pavement conditions with and without treatment, treatment cost, age, and street classification (arterial, collector or residential/local street). The candidate sections with the largest weighted cost-effective ratio values are prioritized in the software's treatment recommendations, given the constraints of the jurisdiction's funding resources. Typically, jurisdictions have only a fraction of the funds required to maintain their street and road networks at their optimal levels, therefore; StreetSaver® will typically prioritize preventive maintenance treatments over rehabilitation or reconstruction treatments, due to their high cost-effectiveness value. The software will recommend a percentage of total maintenance that should be geared towards preventive treatments.

While preventive maintenance is only one element of a pavement preservation program, it is crucial for preventing further deterioration of roadways when funding resources are constrained. Unlike

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a “worst first” strategy, keeping good roads good ensures that costlier repairs will be less likely in the future. In the long run, preventive maintenance saves taxpayers money.

Measuring performance

In order to ensure that local jurisdictions were employing cost effective maintenance strategies, MTC, with the concurrence of local public works agencies, introduced a performance measure into the formula used for allocating regional funding. Regional funding for street and road maintenance is now conditioned on how well jurisdictions meet their defined targets for preventive maintenance.

MTC considers preventive maintenance as any maintenance treatment applied to a roadway that has a pavement condition index (PCI) of 70 or above. It is not the particular treatment that is im-

portant, rather the condition of the roadway that it is being applied to. Research has shown that the life extension value of lower cost maintenance treatments is greatest while the pavement is still in good condition. While it can be generally said that any pavement with a PCI of 70 or above is in “good” condition and will respond well to preventive maintenance, there is a gray area for some roadways within the 60 to 70 PCI range, as to whether or not they can also garner the same life extension from lower cost treatments as those that are above 70. This is especially true in the case of residential streets and low traffic rural roadways that suffer mainly from “non-load” related distresses. For this reason, MTC allows jurisdictions preventive maintenance “cred-

it” for treatments applied to arterial and collector roadways with a PCI of 70 or above, and residential roadways with a PCI of 60 and above - provided the treatment provides a life extension value consistent with a preventive treatment.

The basic method for measuring preventive maintenance performance is to determine the ratio between the percent of total maintenance budget a jurisdiction actually spends on preventive maintenance versus the percent of total budget that is recommended to be spent on preventive maintenance by StreetSaver®. Because the recommended percent of budget comes directly from each jurisdiction’s pavement management database, it will vary depending on individual network characteristics. Jurisdictions with a very high network PCI will have a higher percent of budget recommendation for preventive maintenance and those with a very low PCI will have a lower percent of budget recommendation. Since the recommended amount

of preventive maintenance is expressed as a percentage, jurisdictions are not rewarded or penalized based on the size of their jurisdictions, the current condition of their pavements or the size of their maintenance budgets. Data on actual preventive maintenance applied is extracted directly from the jurisdiction’s pavement management database. Maintenance history is examined to determine what percentage of total maintenance expense was for maintenance on streets with qualifying pavement conditions. The ratio of actual to recommended preventive maintenance expenditure is used as the basis of the jurisdiction’s preventive maintenance score and determines the share of funding they will receive for the performance factor.

Impact on pavement conditions

Every year, beginning in 2001, MTC has assessed and published the conditions of the Bay Area’s local streets and roads. Prior to 2005, the average Bay Area pavement condition had been slipping by one to two points a year, bottoming at a regional average PCI of 63 — dangerously close to the point (PCI of 60) where we would expect deterioration to begin taking place at a far more rapid rate. This trend reversed course in 2006 and the Bay Area’s average PCI has been rising by one point per year and currently stands at 66. This three point change is no small achievement given that funding for maintenance, particularly from state gas tax and local revenue, has been declining. Some federal program and state bond funding has helped to keep maintenance programs afloat, but these fund sources are small relative to the amount of funding required to maintain the roadways every year. In essence, local jurisdictions have demonstrated that with good maintenance strategies, it is possible to do more with less.

The positive trends in pavement conditions are likely a result of several factors: better paving materials, the widespread use of pavement management systems and greater employment of cost effective pavement preservation strategies. By itself, MTC’s recent practice of conditioning regional funds on performance cannot take credit for the gains in the regional PCI over the last several years; however, the practice helps to communicate the importance of preventively maintaining the local street and road networks to those decision-makers and stakeholders who may not be as well versed in preservation concepts. Public works agencies have noted that the existence of the performance measure has been effective at the local level in keeping preventive maintenance budgets intact. More importantly, the emphasis on performance also helps to demonstrate to the public that local jurisdictions are using existing transportation resources wisely. Public confidence in local governments’ use of taxpayer dollars will be critical to gaining support for additional funding in the future.



Carrying some 260,000 vehicles daily, the San Francisco-Oakland Bay Bridge is by far the busiest toll bridge in the Bay Area. This aerial view shows the West Span of the bridge, looking west from Yerba Buena Island.

Photo: Bill Hall, Caltrans



Chico State conducts tests of advanced highway surface preparation / protection treatment

By Tanya Komasa, CIM program

The Concrete Industry Management (CIM) Program at Chico State has been participating in testing of a novel patent pending reactive silicon lithium polysilicate chemistry (SiRE), commonly known as Transil and Transil Plus, which chemi-

mechanically restoring friction levels and then protecting and preserving the surface with the specific surface wearing chemical treatment, while reducing costs and minimizing the impact on traffic.

The material is in the latter product development stage leading the combined research group to develop new tests to refine application methods and market validation with larger field trials on both new and existing surfaces. CIM researchers, lead by Tanya Wattenburg Komasa, have participated in test applications in California and will develop appropriate testing procedures to evaluate success of the applications and conduct life cycle cost studies. After an initial application in Chico during summer 2009, the Chico team worked with Teichert Construction and Caltrans in October 2009 to apply the treatment to a two-mile section of new concrete on Interstate 80 in the Donner Pass/Lake Tahoe area.

The strength of this concrete pavement protection/preservation approach lies in the combination of the mechanical surface preparation together with the fact that lithium compounds form insoluble bonds with the free calcium in portland cement that lead to increased abrasion resistance, increased water repellence, higher chloride and chemical attack resistance, and a significant reduction in surface deterioration and scaling. This toolbox approach is an exciting advance for concrete paving as it holds great promise for surfaces that wear less, require less re-profiling to maintain traction, and are less vulnerable to water and other chemical penetration through the surface matrix to damage reinforcing steel thus decreasing highway downtime, construction hazards, accidents, and delays. Please contact Tanya Komasa at tkomas@csuchico.edu for more information on current and planned testing.



(Left to right) Tanya Komasa, Stephen Klugherz, Global Vice President for Blastrac and Jeff Koebnick, Convergent Technologies

cally reacts with concrete to offer unique wear resistant surface hardening characteristics. Advanced Concrete Technologies (ACT) in collaboration with Dow Corning Corporation is pioneering the development with assistance from Convergent Concrete Technologies and Blastrac. This combined effort incorporates mechanical profiling machinery and equipment with the SiRE technology. This approach maximizes pavement longevity, increases overall durability on new construction pavements surfaces, and adds life to new and existing pavements by



Test section on I-80



Sweeping in the Sealant on I-80



FP² undergoes legal restructuring, can now take advocacy positions for pavement preservation

Effective January 2010, the former Foundation for Pavement Preservation has undergone a legal restructuring that will enable it to take advocacy positions for pavement preservation.

The foundation now is known simply as FP², Inc., and is actively advocating in favor of pavement preservation in the ongoing federal surface transportation reauthorization "inside the Beltway" in 2010.

"With this year's transition of the former Foundation for Pavement Preservation, a charitable organization, to FP², Inc., with a mission of promotion of pavement preservation, we are embarking on a fresh start," said J. Baxter Burns, II, 2010 president of FP², and executive vice president, Ergon Asphalt & Emulsions, Jackson, Miss.

Last year the existing FP² board determined that the foundation's status as a public charity would not permit it to promote pavement preservation with the U.S. Congress as reauthorization loomed. Its response was the formation of a new entity, FP², Inc., a non-profit trade organization that allows advocacy.

"FP², Inc., will now have the ability to deliver far more to its supporters, without the restrictions of being a charity," Burns said. "Our mission now is to advocate national policies, and support promotional activities and research programs that advance pavement preservation."

Promotional efforts will get strong attention from the new FP². "We'll define a beneficial pavement preservation policy and advocate its adoption at all levels of government," Burns said. "We'll prepare and distribute new promotional information, and create national, unified messages, all to support our new advocacy role in pavement preservation."

In addition, FP² will continue to be very visible at all

national and regional trade shows and conferences, and will continue its financial support of the National Center for Pavement Preservation (NCPPI).

To this end, FP² publishes a flagship quarterly publication, Pavement Preservation Journal, and has extensively revised its website, fp2.org.

In addition to Burns, FP²'s new slate of officers includes Mike Buckingham, Strawser Construction, Columbus, Ohio, vice president; Bob Koleas, Western Emulsions Inc., Dana Point, Calif., secretary; Bill O'Leary, Martin Asphalt Co., Houston, Tex., treasurer; and Jim Moulthrop, Fugro, Inc., Austin, Tex., executive director.

For nearly two decades, FP², Inc., and its public and private sector partners have maintained that the key to cost-effective, optimized pavement life is the application of the "right treatment, to the right pavement, at the right time." Experience shows that spending a dollar on pavement preservation can eliminate or delay spending \$6 to \$10 in future rehabilitation or reconstruction costs.

FP² was first established in 1992 as the Foundation for Pavement Rehabilitation and Maintenance Research. Founding associations included the Asphalt Recycling & Reclaiming Association, the Asphalt Emulsion Manufacturers Association, and the International Slurry Surfacing Association. Soon after, it was renamed the Foundation for Pavement Preservation, a charitable organization funding research. It was again restructured in 2010 as FP², Inc., an advocacy and promotion institution.

For more information please contact James S. Moulthrop, P.E., Executive Director, FP², Inc. 512.977.1800, jmoulthrop@fugro.com



FHWA announces Construction and System Preservation Team Leader

By Steve Mueller, FHWA Resource Center

Bryan Cawley



Many folks in the preservation community have asked me who will be the next FHWA Construction and Systems Preservation Team Leader. The announcement of Bryan Cawley being promoted to this position was made on Monday January 25, 2010. I've worked with Bryan Cawley for the past several years on environmental stewardship and recycling issues for the pavement and materials programs.

The easiest way to introduce Bryan is to share with you some of his accomplishments. He currently serves as the Assistant Division Administrator in the Utah Division. Since joining FHWA in the fall of 1997, Bryan has held a variety of positions in the agency which include working

in the North Dakota, Nebraska and Utah Divisions as well as the Resource Center. Prior to working with FHWA, Bryan worked with Staker Paving and Construction and the Utah Dept. of Transportation. Bryan holds a Bachelor Degree in Civil Engineering from the University of Utah, a Masters Degree in Construction Management from Iowa State University, and an MBA from the University of Nebraska. Bryan is also a licensed Professional Engineer in the state of North Dakota.

We welcome Bryan to this outstanding team of individuals that are diligently working toward "Keeping the Good Roads Good" in California and around the nation!



FHWA PPETG meeting highlights

The FHWA Pavement Preservation Expert Task Group (PPETG) met in Scottsdale, Arizona, on December 13, 14 and 15, 2009. Larry Rouen, Caltrans Division of Pavement Management, attended the general meeting, while Mary Stroup-Gardiner, from the CP² Center, attended the Emulsion Task Force meeting.

Larry Rouen gave presentations about the Center's Pavement Preservation Database (<http://www.ecst.csuchico.edu/cp2c/software/pptdb/index.php>), the Center's Strategy Selection program (<http://ceresearch.ecst.csuchico.edu/TreatmentSelection/>), and concrete slab replacement.

Some other highlights from the meeting

The Asphalt Recycling and Reclamation Association (ARRA) have published the ARRA Basic Asphalt Recycling Manual. A preview of the chapters is available at: <http://arra.org/downloads/ARRABARMTickler.pdf>

The Pavement Preservation Training and Certification Subcommittee have completed their final report.

The NCHRP project 14 – 17, Manual for Emulsion Based Chip Seals, has been completed and should

be published by April, 2010.

The next meeting of the PPETG will be sometime in May or June, 2010.

FHWA expert task force on emulsions

The Emulsions group is a subset of the FHWA Pavement Preservation Expert Task Group (ETG). The Emulsions ETF is divided into five subcommittees with a key leader for each:

- Emulsion testing and residue recovery (Arlis Kadrmas)
- Residue testing (Gayle King)
- Aggregates, mix design, and performance tests (Mary Stroup-Gardiner)
- Approved supplier certification (Roger Hayner)
- Inspection and acceptance (Colin Franco)

Emulsions are used in a wide range of applications. A task force survey of research needs was used to focus the initial work of the subcommittees on emulsions for tack coats, chip seals, and micro-surfacing applications. Work at the meeting included an update on Federal Lands Study on chip seals, results and use of the sweep test for chip seal rate of set and durability, and field test results using the sweep test.



2010 CCSA meeting held in Seaside, California

About 200 people from industry, local agencies and Caltrans attended the California Chip Seal Association's 2010 Pavement Preservation Conference in Seaside CA on January 20-21, 2010, a great showing given the bad weather. CCSA President Mike Heath, a CSU Chico graduate, presided over the two day conference.

Dr. Shakir Shatnawi, Caltrans State Pavement Engineer, shown in picture below, presented the opening remarks by stating the financial situation for the state is not good. Caltrans needs \$6.3 billion but is actually receiving only about \$1.5 billion. The pavement preservation budget remains constant at about \$206 million while the funding for the rehabilitation projects has declined drastically. He indicated that Caltrans has the following priorities with its limited funding over the next few years:

- Innovation
- Customer service
- Partnerships
- Pavement preservation

He mentioned that by having a proactive pavement preservation program, the State could save 50-70% of their total budget over the next several years.

The remainder of the morning session on January 20 dealt with the partnership between the CCSA and the PPTG (Larry Rouen of Caltrans), cost effectiveness of pavement maintenance (Gary Hicks

of the CP² Center), pavement evaluation methods (John Harvey of UC Davis) and the need for a pavement management system to support pavement preservation programs (Imelda Diaz, LA County).

The afternoon sessions focused on the following topics:

- Emulsion Basics
- Removal and replacement of pavement markings
- Conventional chip seals
- Rejuvenating chip/scrub seals

The afternoon session concluded with a lifetime achievement award given to a long time member and past president, Steve Olsen, of Intermountain Slurry Seal.

The second day started with a lively discussion on quality control/quality assurance issues related to chip seal applications. This was presented by Scott Dmytrow (Telfer Oil) and Joe Peterson (Caltrans), they described the steps that need to be taken to achieve good projects. The remainder of the program included presentations on:

- Modified binder chip seals
- Asphalt rubber chip seals
- Rejuvenating fog seals
- Slurry, micro surfacing, and Rubber Emulsion Aggregate Seals (REAS)

President Mike Heath



Dr. Shakir Shatnawi



Contractor	Agency	Award
International Surfacing Systems	City of Roseville	Chip Seal Project of the Year
Intermountain Slurry Seal	City of Sacramento	Cape Seal Project of the Year
Western Emulsions	Lake County	Chip Seal Innovative Project of the Year
Valley Slurry Seal	City of Paso Robles	Slurry Seal Innovative Project of the Year

All presentations can be found on the CCSA website located at www.chipseal.org.

The second day of sessions ended with the presentation of quality awards to agencies and contactors. A list of the achievement awards is given on the left:

Overall, the annual two-day conference was a great success considering the bad weather and the state of the economy. Thanks to CCSA for affording the agencies in the State this great pavement maintenance educational opportunity and for including top notch exhibitors covering the latest in pavement maintenance products and technology (more than 20 in total).



(Left to right) Jim Ryan, Don Barrett, Ken Talley, Steve Olsen (with plaque), Brent Towns, Scott Dmytrow, Rick Best, and Mike Heath.



PPTG update

By Larry Rouen, Hans Ho and Craig Hennings, PPTG co-chairs

Plans for the December 7, 2010 all-members meeting

The Pavement Preservation Task Group (PPTG) held its all members meeting on December 7, 2009. Larry Rouen welcomed the members to the meeting and provided an update on the new Division of Pavement Management. He also discussed the financial plight of the State indicating that it is having an impact on getting things accomplished.



PPTG chairs, Craig Hennings, Hans, Ho and Larry Rouen

Dr. Mary Stroup-Gardiner reported the results of the election of the industry co-chairs. She reported there are still some groups without industry co-chairs and Larry Rouen indicated some of the Caltrans co-chairs would be changed. Next Hans Ho and Craig Hennings were re-elected to another 2-year term as the PPTG industry chairs. There was considerable discussion on combining some of the

groups and upgrading the leadership in some of the inactive groups. If changes in the membership of the groups are made the co-chairs need to notify Linda Farrell at lfarrell@csuchico.edu. All membership lists will be updated at least once per year. The

members of all subgroups are posted on the PPTG website at www.cp2info.org/taskgroup.

Following the election report, each of the subgroups provided a short report on their accomplishments for 2009 and plans for 2010. The reports can be found on the PPTG website in the meeting minutes or as a presentation. Larry Rouen then discussed the status of the 2010 specifications and Joe Holland reported on the innovation database and how to use it.

Dr. Mary Stroup-Gardiner also provided an update on the Center. She discussed the expansion for the Center to include satellite offices at Cal Poly

Joe Holland discusses the innovation database



Pomona and CSU, Long Beach. All three campuses are working on the development of a Caltrans Pavements Academy. At this time, she reported the effort is being headed up by Dr. Dragos Andrei of Cal Poly Pomona. She indicated the existing

Continued, next page

Table 1. Pavement Preservation Task Group (PPTG) Co-Chairs
 Terms run from April 12, 2010 to April 2012

PPTG Subgroup Chair	Industry Co-Chair F (flexible pavement) R (rigid pavement)	Caltrans Co-chair
PPTG, Flexible Pavements	Hans Ho	Larry Rouen
PPTG, Rigid Pavements	Craig Hennings	Larry Rouen
Binders	Edgard Hitti	Kee Foo
Chip Seals	Jim Ryan	Shawn Rizzutto
Crack Seal/Joint Resealing	Wally Smith	Karen Bonnetti
Diamond Grinding	Casey Holloway	Dulce Feldman
Dowel Bar Retrofit	Craig Hennings	Kirsten Stahl
Education ¹	Brandon Milar (F) Craig Hennings (R)	Hector Romero
Fog/Rejuvenator Seals	Jim Brownridge	John Fox
Innovation	Scott Metcalf (F) John Roberts (R)	T. Joe Holland
Interlayers	Scott Dmytrow	Osama Abdulshafi
Local Agencies	Erik Updyke Greg Kelley Nina Buelna Vijay Sinha	Shadi Saadeh Gary Hicks
Partial/Full Depth Repair	Vincent Perez	Kirsten Stahl
Patching and Repair	Michelle Olinger-Jolly	Nik Beach, D3
Pavement Management	Margot Yapp	Sui Tan
Recycling	Don Matthews	Joe Peterson
Research	Larry Santucci (F) Larry Scofield (R)	Michael Samadian
Slurry/Micro Seals	Steve Olsen	Dragos Andrei
Strategy Selection	John Roberts (R) Ding Cheng (F)	Alfonso Ochoa
Surface Characteristics ²	Brandon Milar (F) Larry Scofield (R)	James Lee
Thin Overlays	Skip Brown	Cathrina Barros

¹ Training, workshops, and conferences; now includes the old outreach committee.
² Ride, skid and noise; now includes old quiet pavement group.
³ The Warranties Committee was inactive and eliminated. Warranties issues can be discussed within the other appropriate sub-groups.

Center contract with Caltrans will expire the end of February 2010 at which time another contract should (hopefully) be in place.

Dr. Hicks reported on upcoming conferences including:

- California Chip Seal Conference to be held in Seaside, Calif., on January 20-21, 2010.
- Association of Asphalt Paving Technologists to be held in Sacramento on March 8-10, 2010.
- International Conference for Pavement Preservation to be held in Newport Beach on April 13-16, 2010.
- FHWA sustainability conference to be held in Sacramento on September 15 – 17, 2010.

At the end of the meeting a self-evaluation was conducted. It was decided that the PPTG needs to establish goals and priorities for 2010. Each subgroup was to provide its goals and priorities to the PPTG chairs. The next co-chairs meeting will be held in Newport Beach on April 12 from 1-5 pm. The “all members” meeting for 2010 will be held on December 7, 2010 at a site still to be determined.

PPTG Chairs meeting, December 29, 2009

At this meeting, the PPTG chairs decided to combine some of the subgroups and appoint new Caltrans co-chairs for some of the groups. Table 1 provides a list of the new groups and co-chairs. Other decisions included:

- The old Outreach Committee was combined into the Education Committee. Gary Hicks and Laura Melendy are also members of the Education Committee.
- The Quiet Pavements Committee was integrated into the Surface Characteristics Committee.
- The Warranties Committee was inactive and eliminated. Warranty issues can be discussed within the other appropriate sub-groups.

2010 PPTG plans, goals and priorities

The PPTG co-chairs received input for the various sub-groups and established the following as their primary goals and objectives:

- Aid in the development of an effective and comprehensive CALTRANS Pavement Management System.
- Promote and educate local agencies and Caltrans engineers in the benefits and appropriate uses of Pavement Preservation and a Pavement Management System (MTAG training).
- Conduct field and HVS evaluations of extended life benefits of pavement preservation treatments.
- Participate with Rock Products sub-committee on training and certification of inspectors.
- Secure funding and develop protocol for pilot projects with respect to initial testing and follow up evaluations.



Center staff participate in the 89th TRB meeting

Mary Stroup-Gardiner, Tanya Komasa and Ding Cheng attended the 89th Transportation Research Board meeting January 10-14, 2010 in Washington, D.C. The TRB Annual Meeting program covered all transportation modes and attracted more than 10,000 attendees who provided 3,000 presentations in nearly 600 sessions. The spotlight theme for the 2010 meeting was "Investing in Our Transportation Future – BOLD Ideas to Meet BIG Challenges".

The Foundation of Pavement Preservation (FP²), surrounded by a wide range of pavement preservation advocates presented to Amber Nanthavongsa, the daughter of the late Jim Sorenson, a lifetime achievement award to recognize his passion and commitment to our infrastructure preservation. This represents the first presentation of the FP² Annual James Sorenson Award for commitment to pavement preservation.

Dr. Ding Cheng and Dr. Tanya Komasa attended Congressman James Oberstar's keynote speech at the 2010 International Road Federation Annual Award Luncheon on Monday, January 11, 2010. The IRF



Ding Cheng (center) met David Henderson and Stephane Charmot of Road Science, LLC at the 2010 TRB Meeting

Annual Awards Luncheon recognized the winners of the 2009 Global Road Achievement Awards (GRAA), which honor and recognize road-industry projects that demonstrate excellence and innovation in road development worldwide.

Dr. Cheng presented a new strategy selection approach for flexible pavement preservation: "Improving Pavement Preservation Treatment Strategy Selection Using Expert System Approach" in a well attended Monday session. This paper utilized the expert experiences from a knowledge database developed from Caltrans MTAG and pavement preservation engineers. The paper is included in the TRB compendium DVD. The strategy selection software is at <http://ceresearch.ecst.csuchico.edu/TreatmentSelection>.



(From Left to Right) Larry Galehouse, James Moulthrop, Amber Nanthavongsa, John Rathbun, and Sid Nanthavongsa

Dr. Stroup-Gardiner and Dr. Cheng are either members or official "friends" of both the TRB committees on Pavement Maintenance and Pavement Preservation. At these meetings they presented CP² Center updates, information on the upcoming International Conference on Pavement Preservation (ICPP), suggestions for next year's session topics and research needs statements submitted each year through the TRB committees. Dr. Komasa was in attendance as well and was introduced to our pavement preservation folks and our activities. We have also solicited her help with expanding the representation of the rigid pavement side of pavement preservation.

Both Drs. Cheng and Stroup-Gardiner met with Dave Henderson and Stephane Charmot of Road Science, LLC over coffee to discuss how the CP² Centers can team with their company to expand their documentation, research, and data analysis needs through sponsoring the newly formatted CP² Internships. At Chico, the internships are set up to provide either student summer funding or partial funding over two semesters to specifically work on a well-defined project of benefit to the company. The final product of the internship will be three academic credits, funding, and real world experience for the student and an independently developed report and presentation for the sponsor. The Center engineers will provide the technical oversight to assure the quality of the final product.



Update on CIWMB project titled “Evaluation of Terminal Blends and a Preliminary Study on Warm Mix”

By R. Gary Hicks, CP² Center

Terminal blends

Terminal blend asphalt rubber binder is a form of the wet process where Crumb Rubber Modifier (CRM) is blended with hot asphalt binder at the refinery or at an asphalt binder storage and distribution terminal and then transported to the asphalt concrete mixing plant or job site for use. The particle size of CRM used in the terminal blends is finer than that of the field blend currently used by Caltrans. The terminal blend does not require subsequent agitation to keep the CRM particles evenly dispersed in the modified binder. In the past, such blends manufactured in California contained 5 – 10 percent of ground CRM by mass (which does not satisfy the ASTM D 8 definition of asphalt rubber) and other additives to eliminate the need for agitation. However, new formulations have been developed that contain from 15 – 22 percent CRM by total binder mass. Currently the terminal blend with minimum 15% tire rubber content qualifies for the CIWMB chip seal grants, but does not yet qualify for the hot mix grants. Initially, the CIWMB grant requirements weren't clear about including the use of terminal blends primarily for these reasons:

- They are not certain of the performance benefits of this product and how it compares with the field blended asphalt rubber process.
- There may be gaps in the technical knowledge that have to be addressed before the product can be used statewide. However, Caltrans has just begun to use terminal blends as a PG-TR products in both HMA and chip seal applications.
- The need to be assured that CRM is being used in the product. A process needs to be developed to ensure that the CRM usage is properly tracked or how they can be assured the rubber is in the product.
- A full range of potential pavement maintenance applications for which terminal blends can be used as a paving material has not been completely identified.

Warm mixes

The CIWMB also requested a preliminary study on whether there is any benefit of using warm mix technologies for AR chip seals and mixes. The potential savings in energy and reduction in emissions could be great. Further, by reducing the temperatures of application, environmental controls presently used for chip seals may not be required. This will potentially increase the usage of asphalt rubber chip seals by making the product more cost effective.

At present, there are several warm mix technologies that are being used in the United States, which

include forms of emulsion technology, addition of wax, or addition of a clay substance. Other products are also emerging. The products most evaluated to date include SASOBIT, Aspha-min® zeolite, and Evotherm. These additives allow the mixes to be placed at lower temperatures, up to 100°F. As of the beginning of this study, the warm mix additives have not been widely used with hot mixes or spray binders containing hot applied asphalt rubber. Use of the additives in these applications could result in energy savings and reduce emissions because the additives could allow the construction to be taken at lower temperatures without the limitations by the current environmental controls.

Project objectives

This project will attempt to answer the questions posed in the background section about the terminal blend. The study includes a literature review, a survey of users of terminal blends in California, Nevada, Texas and Florida as a minimum, and a test section placed in the Antelope Valley of unincorporated Los Angeles County in July 2009.

The objectives of the preliminary study on warm mix are to evaluate the use of warm mix technologies for AR hot mixes and determine whether these technologies will allow operations at lower temperatures without harming the performance of the mix, and to evaluate the use of warm mix technologies for use in asphalt rubber spray binders. This should result in significant energy savings and a reduction on the emissions.

Work tasks

Task 1 – Identify existing Caltrans and local agency projects placed containing terminal blends, including the percentage of CRM used for each of the projects.

To date, we have contacted agencies and suppliers of terminal blends and have determined the following:

- The Caltrans projects consist of 10 pilot projects placed in the late 90's, test sections including the Firebaugh and D1 Mendocino projects placed in the early 2000's, the HVS test sections at the Richmond field station, and the 5 year warrantee job on 395 between Reno and Susanville. Preliminary data collected so far would suggest the terminal blends with 15% CRM will perform as well as the AR wet process field blends.
- Local agencies have used terminal blends for hot mix and chip seals since the early 1990's. The major suppliers (Paramount and Valero) have provided us with a list of the projects. We have summarized projects in a tech memo and have developed a first draft of the tech memo documenting these projects.
- We met with LA County and Paramount Petroleum in January, 2009, to discuss the test sections of terminal blend chip seals. We conducted a second meeting on May 12, 2009,

Continued, next page





to finalize plans for the project. We also toured the Paramount facility in Long Beach with CIWMB staff on May 13, 2009 to review their QC process. The CIWMB staff felt comfortable with the QC process.

- We participated in the construction of the terminal blend chip seal project in Los Angeles County the week of July 5. The construction was completed in three days, and on the fourth day the pavement was striped. Dr. Hicks assisted Los Angeles County to draft the pre-construction and construction report which has been submitted to the CIWMB.
- We continue to work with the suppliers of terminal blends to identify projects used in the state of California. These are being included in a data base for all projects.

Task 2 – Identify and evaluate the use of terminal blends in the states of Arizona, Texas and Florida to see how they perform and in which applications they are used.

A survey of all states in the United States was completed to identify the use of terminal blends. To date, about 30 states have responded, but we are focusing on those agencies who use terminal blends including Arizona, Nevada, Texas, and Florida.

Task 3 – Identify any challenges or gaps in knowledge when using terminal blends.

The major challenges or gaps in knowledge identified to date are as follows:

- How can an agency ensure that the CRM contents can be tested to quantify the number of tires being used by this process? Currently, it would be easy to use polymers as a substitute for CRM. We have met with the terminal blend providers to review the QC process which allows agencies to tour their facility to see how they control the CRM input. Since the producers used a batch process, we feel that they can provide the user with a certificate of compliance (COC) that certifies the components of the batch as well as the CRM is from California.
- We continue to contact other users to identify additional challenges in the use of terminal blends. So far there seem to be few other problems that have been identified.

Task 4 – Identify other pavement maintenance applications for which terminal blends could be used including chip seals and thin HMA overlays. Indicate how many tires might be consumed using these new maintenance treatments.

We have discussed the possible uses with industry and users and based on our work to date, the terminal blend asphalt can be used for the following applications:

- Hot mix - They can be used any place where an AR field blended hot mix can be used. The initial findings from a review of Caltrans research and field projects suggest that they are equivalent in

performance to the field blends.

- Chip seals - They can be used anywhere an AR chip seal be used. Because of the lower production temperatures, smoke is not a major issue.
- Slurry seals - In this application, the slurry seals are an integral part of the asphalt and not just a filler. Rubber modified slurry seal products are produced by PMI, CPM and Roy Allen Slurry Seal, Inc.

Task 5 – Contact the warm mix technology industries to determine whether these applications have been tried anywhere in the world.

We continue to work with the producers of warm mix technologies for use for hot mix. Here are our preliminary findings:

- SASOBIT has been used with RHMA-G in the San Jose area with no problems.
- Evotherm and Green Drum technologies have been used on shoulders along I-5 near Fresno with RHMA-G.
- District 3 constructed a project using Evotherm and RHMA-O on Interstate 5 near Orland in May, 2009.
- District 11 constructed a test section near San Diego in June 2009 using 3 of the warm mix technologies using a RHMA-O project, Sasobit, Advera, and Evotherm.
- District 3 constructed a project using RHMA-O and Evotherm on SR 70 near Marysville in late June.
- District 1 constructed a project using RAC-G and Evotherm on US 101 in September, 2009.
- District 3, places a project on US 99 north of Sacramento using Evotherm.

We continue to discuss with all the major suppliers of the warm mix technology the potential use of their technologies with asphalt rubber chip seals. We have contacted applicators to see if we can get a test section in the Sacramento area during spring, 2010.

Task 6 – Brainstorming with warm mix suppliers.

Based on the findings in Task 4, it appears warm mix technologies can be used with asphalt rubber hot mixes. We feel it can also be used in hot spray applications and have met with the major suppliers of warm mix technology. The outcome of this effort was that the suppliers will begin to look at possible projects in which to try this application. We continue to participate in the California warm mix ETG, discussing use of both terminal blends and asphalt rubber with the various warm mix technologies.

Task 7 – Prepare a report summarizing the findings of the study and make a presentation to the Board on the findings and the recommendations.

We continue to work on a technical memo to summarize the work done to date on terminal blends. The first draft is complete. We are now working on the tech memo for warm mixes. The final reports are due on May 15, 2010.

Upcoming events

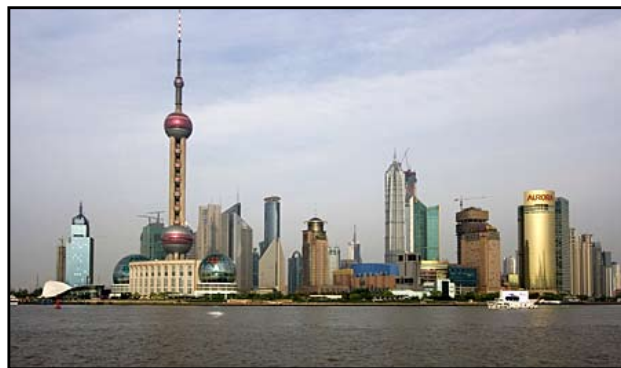
March 2010

2 – 5 – AEMA-ARRA-ISSA Annual Meeting. Trump International Beach Resort, Sunny Isles Beach, Fla. www.aema.org/

7 – 10 - Association of Asphalt Paving Technologists 85th Annual Meeting. Sacramento, Calif. www.asphalttechnology.org/annual-meeting.html

April 2010

12 – 16 – First International Conference on Pavement Preservation, April 13th-15th. (April 12th and 16th - pre- and post-conference workshops/meetings) Newport Beach, Calif. www.pavementpreservation.org/icpp



June 2010

3 – 5 – GeoShanghai International Conference, Shanghai, China. www.geoshanghai2010.org



For a complete listing of upcoming events listed with CP², go to www.cp2info.org/center.

California hosting national and international conferences in 2010

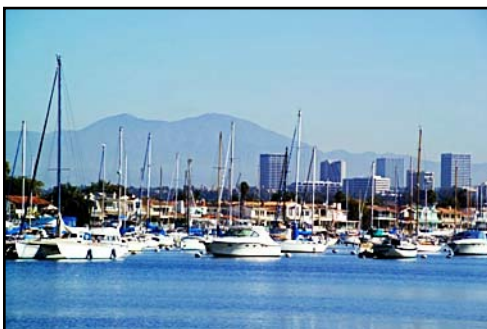
AAPT meeting to be held in Sacramento in March 2010

The Association of Asphalt Paving Technologists (AAPT) Annual Meeting and Technical Sessions will be held in Sacramento, California at the Hyatt Regency at Capital Plaza on March 7–10, 2010. Randell Iwasaki, Director of Caltrans will provide the opening remarks. AAPT is one of the most prestigious asphalt organizations in the United States. Jim Moulthrop of Fugro (and the Executive



Director of the Foundation for Pavement Preservation) is its current President and the AAPT board has put together an interesting program. A discount is available for Caltrans employees. Please contact the AAPT office for further details. For more information, including the schedule for the meeting, please view their website at <http://www.asphalttechnology.org/>.

First International Conference to be held in Newport Beach in April 2010



Caltrans, FHWA and the Foundation for Pavement preservation are the primary hosts of this important event to be held in

Newport Beach on April 13–15, 2010. The conference program and registration information can be found on the conference website at www.pavementpreservation.org/icpp/. Speakers in the opening session will include Randell Iwasaki, Director of Caltrans and King Gee, Associate Administrator for Infrastructure at FHWA, as well as prominent industry speakers all concerned with preservation of the highway the infrastructure using preservation techniques. Information on becoming a sponsor or and exhibitor at this event can be obtained by contacting Helen Bassham at conferences@techtransfer.berkeley.edu. We look forward to seeing you at Newport Beach in April 2010.

International Conference on Sustainable Concrete Practices: Practices, Challenges, and Directions, September 15 – 17, 2010, coming to Sacramento

This conference is being organized by Federal Highway Administration and the National Concrete Pavement Technology Center and will be held in Sacramento at the Hyatt Regency on September 15-17, 2010. The tentative program can be found on the FHWA website at www.fhwa.dot.gov/pavement/concrete/2010acptpconf.cfm. For more information please contact Sam Tyson, Office of Pavement Technology at 202-366-1326. The University of California Pavement Research Center and the CP² Center are co-sponsors.



Center news

CP² Center reorganization



Caltrans established the California Pavement Preservation Center at California State University, Chico in July 2006 and fully funded the Center in January 2007. The mission of the Center is

to serve as a leader in a partnered effort between government, industry and academia participants to advance and improve pavement preservation practices through education, innovation, applied and practical research, technology transfer, and implementation. This includes developing and advancing innovative approaches to pavement preservation.



The CP² Center was reorganized on January 1, 2010. Dr. Mike Ward, Dean of College of Engineering, Computer Science, and Construction Management of Chico State, became the Chair of the Board of Directors, and Dr. Ding Cheng, from the Civil Engineering Department of

Chico State, started as the interim Director of the CP² Center. Currently, the CP² Center has offices at three California State Universities, Chico, Pomona, and Long Beach. To better serve the major clients, such as Caltrans, the CP² Center plans to add a fourth university, Cal Poly San Luis Obispo. The Center has attracted an excellent team including Senior Pavement Engineer Dr. Mary Stroup-Gardiner, Associate Professor Denny Gier, Construction Management, CSUC, Dr. Tonya Komar from Concrete Industry Management, CSUC, Program Manager Dr. Gary Hicks, Dr. Dragos Andrei from Cal Poly Pomona, Dr. Shadi Saadeh from Long Beach State. The Center will contact Associate Professor Ashraf Rahim from Cal Poly San Luis Obispo as another senior pavement engineer working for the Center.



Looking for help on pavement preservation issues?

If you need technical assistance on pavement preservation issues, please feel free to contact Dr. Gary Hicks at 530-898-3685 or rghicks@csuchico.edu. The Center has established a help desk to answer your questions.

Pavements Academy Update

The CP² Center staff continued work on developing training modules for Caltrans' Pavements Academy. The purpose of the course is to introduce participants the basic principles of structural pavement design, maintenance and rehabilitation and to familiarize Caltrans personnel with two specific design methods: the Caltrans Highway Design Manual (HDM) and the Mechanistic-Empirical Design Method (CalME/MEPDG).

The Academy is divided into two major parts:

- Part I (Materials) deals with the selection and characterization of sub-grade, sub-base, base and surface materials for highway pavements with dedicated modules for asphalt binder, asphalt concrete, Portland cement, and Portland cement concrete.
- Part II (Design) presents the basics of pavement design, maintenance and rehabilitation. The Caltrans HDM method and mechanistic-empirical methods that the Department will

likely adopt in the near future are discussed in more detail. In addition, the course introduces attendees to life cycle cost analysis, pavement management and pavement preservation and discusses the integration of life cycle cost analysis and preservation in the design process.

Each part of the Academy will include 10 training modules and will take three and a half days to complete. Student learning will be assessed with in-class assignments and a final test. Successful completion of Part I of the Academy will be a prerequisite for Part II.

The training modules are being developed by Mary Stroup-Gardiner, Shadi Saadeh, and Dragos Andrei of the CP² Center. The materials are scheduled to be completed by the end of summer, 2010. For more information on this effort, please contact Mary Stroup-Gardiner at the CP² Center, (mstroup-gardiner@csuchico.edu) or Hector Romero (hector_romero@dot.ca.gov) with Caltrans.

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CP² Center, 25 Main Street, Suite 202, California State University, Chico, Chico, CA 95929-0603

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