



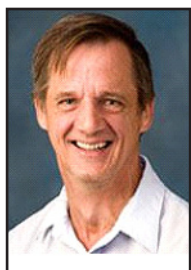
CP² CENTER NEWS

Newsletter of the California Pavement Preservation Center

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Interview with Peter Vacura, Caltrans Co-Chair, Pavement Preservation Task Group (PPTG)



Peter Vacura

Peter Vacura is the Chief, Office of Asphalt Pavements in the Caltrans Division of Maintenance. Mr. Vacura is the Caltrans Co-Chair of the Pavement Preservation Task Group (PPTG). He is also acting as the Caltrans Co-Chair of the Hot Mix Asphalt Task Group and has been actively involved in the pavement arena for the past 12 years. Before joining the pavements program, he was the Chief of the Office of Pavement Rehabilitation for 5 years during which he was responsible for the field testing and design of rehabilitation projects throughout the State. Mr. Vacura has also been leading the statewide smoothness initiative focusing on improving specifications and introducing the use of the inertial profiler for contract acceptance. Mr. Vacura led in the initial efforts to develop a Pavement Management System for Caltrans and was instrumental in procuring the Ground Penetrating Radar (GPR) contract for collecting structural section data on the network. He also led efforts to procure Fugro as the provider of automated pavement condition surveys.

As the Caltrans Co-Chair on the PPTG, Mr. Vacura is actively involved in leading various subtask groups in the development of specifications, guidelines, and evaluation reports for fog seals, slurry seals, scrub seals, modified binders with polymers and tire rubber, and warm mix technologies in preservation treatments. He is also responsible for the development of the innovation and strategy selection databases being developed by the Center. The Center staff asked Mr. Vacura to address the following questions:

Can you provide an update on the PPTG and your plans for it in 2011/12?

The PPTG has been in existence since the early 2000s. It was established to provide a working platform between Caltrans, local agencies, and industry to advance pavement preservation and resolve issues. The background on the PPTG can be found at www.cp2info.org/pptg. Its current organization chart is shown on the next page.

The PPTG is currently working on a number of strategy reviews including terminal blends, slurry seals, scrub seals, and fog seals. This includes identifying projects that these strategies can be incorporated into. Once projects have been targeted, monitoring and evaluating will be required to assess the performance of the strategies. There are also efforts going on to incorporate just in time training (JITT) into projects for chip seals and microsurfacing. The innovation subtask group is currently working on revamping the process for introducing new strategies. If anyone is interested in helping on any of these efforts, they should contact me at peter_vacura@dot.ca.gov.

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What are the priorities of the PPTG during 2011/12 and how will you monitor the progress of the new PPTG subgroups?

The top priority is to establish specifications for the above mentioned strategies. We would like to have these preservation strategies available in our tool box for use on state projects as well as made available for local agencies. The various subtask groups are responsible for developing a work plan and schedule for monitoring the progress and ultimately performing the necessary monitoring and evaluation of the strategy to assess its performance and determine if it is a strategy that the department wants to adopt and implement statewide.

Caltrans continues to place a number of innovative projects. What are your plans for documenting these projects and how will the data be stored?

With the assistance of CP², a database has been developed to help us to track these innovative strategies. The database contains the work plan and data collected during placing and subsequent performance data collected through field evaluations. A

final report is required by the sponsor of the strategy which identifies the final performance and whether it is a strategy that the Department wants to adopt.

How will you keep the PPTG members informed of progress on activities? Will you use a pavement preservation website or the Center's newsletter or both?

That effort needs to be improved upon. Currently, the Center newsletter has been a great source of information with regards to the efforts of the PPTG subtask groups. The website www.cp2info.org/pptg is also a great resource. In the coming months, the Outreach and Training subtask group will convene to discuss ways to improve and enhance the CP² website to provide information to the preservation audience seeking help and assistance in promoting preservation strategies.

What are your plans for another PPTG pavement preservation workshop?

The last one was in 2010. Due to the state's budget issues, the Department, per the Executive Order of the governor, cannot financially support future conferences or workshops, specifically the pavement preservation workshop. The PPTG will have to sit down and determine what alternatives are available.

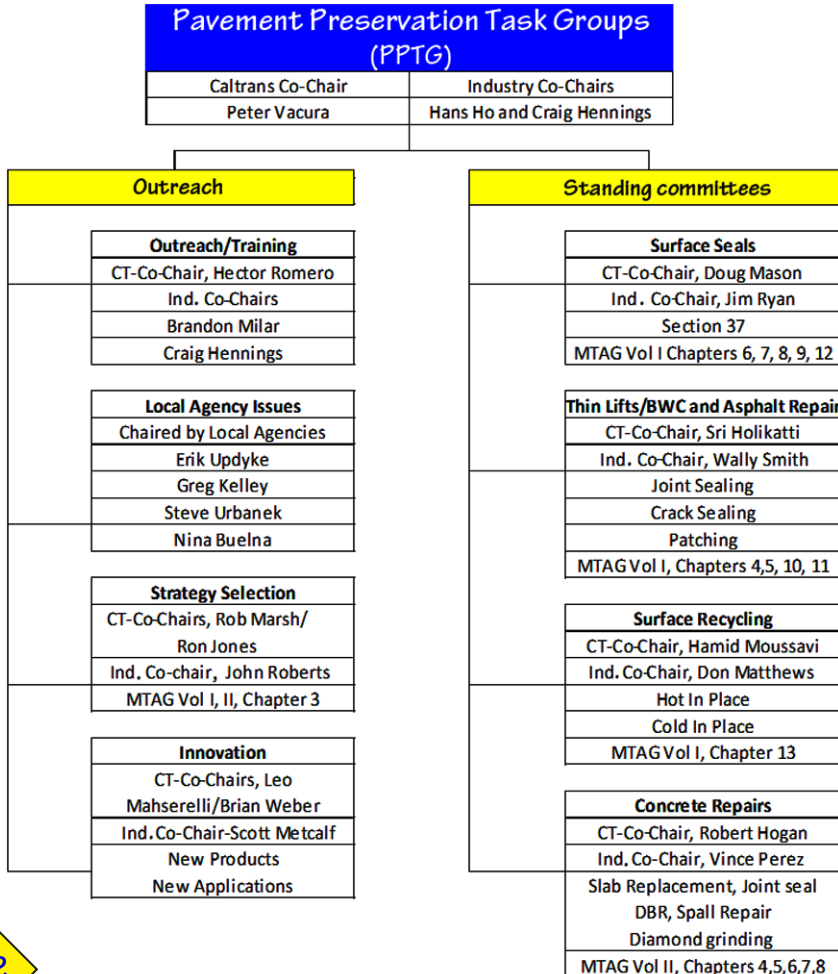
It is important to incorporate pavement preservation into the new pavement management system. Can you discuss how this will be done, as it is needed to document the benefits of preservation treatments?

I think that the strategy selection database is a great start for incorporating pavement preservation into the PMS. This database was pulled from the preservation decision matrix used by the Department for selecting preservation strategies across the state. The decision tree established within the strategy selection program takes into account most of the criteria considered when trying to choose the proper strategy for preservation, such as level of distress, traffic, climate, and cost. Further enhancements will likely include strategy costs, life cycle costs, and an assortment of other variables which can be the starting point for the incorporation of this tool into the PMS.

When will the next general meeting of the PPTG be held?

We are tentatively scheduling the next general meeting for December of this year. It will likely be held in Southern California at a venue still to be determined.

PPTG Organization Chart



Warm mix asphalt CP² Center's 2011 Summary

By Lerose Lane, P. E., CP² Center

In an earlier newsletter, the CP² Center reported on the future of warm mix asphalt (WMA) and listed the technologies currently available. The summer of 2011 is nearly over and the CP² Center is continuing to monitor projects using warm mix technology. The use of warm mix is becoming increasingly more common as Caltrans and other agencies within California have stepped up their usage of WMA, as well as using warm mix rubberized chip seals. Caltrans District 3 has been the most active user of WMA in 2011. Joe Peterson, former District Materials Engineer for District 3, was instrumental in incorporating warm mix technology into many of the District 3 HMA mix designs for this construction season.

Table 1, List of various Caltrans WMA projects placed in 2011

Contract no.	Dist./Co./Rt.	WMA description	Contractor	Construction status
01-499504	01-Men-1	RHMA-G	Granite Const.	Ongoing 9/2/2011*
03-4M1404	03-PLA-49	RHMA-O	Granite Const.	Completed 1/21/2011
03-1F3704	03-SUT-99	RHMA-O	George Reed	Ongoing 9/7/2011*
03-0F5904	03-SAC-5	RHMA-G & RHMA-O	Granite Const.	Ongoing 8/17/2020*
03-1E6704	03-SAC-99	RHMA-G	Teichert	Ongoing 12/27/2011*
03-1F3604	03-PLA-80	RHMA-G	Knife River	Suspended 7/19/2011*
03-3C8904	03-COL-5	RHMA-G & RHMA-O	George Reed	Ongoing 1/10/2012*
03-1F4804	03-YOL-5	RHMA-G	Ghillotti Bros.	Completed 7/13/2011*
03-1F4604	03-YUB-70	RHMA-O	Teichert	Completed 7/20/2011*
03-1A6804	03-ED-50	HMA-W	Teichert	Suspended 6/20/2011*
03-1F4704	03-SUT-20	RHMA-O	Teichert	Ongoing 8/25/2011*

* Estimated completion date from Caltrans ongoing projects

The CP² Center also wishes to take this opportunity to congratulate Joe Peterson on his recent promotion to Chief, Office of Roadway Materials Testing for the Materials Engineering and Testing Services. He brings many years of experience and expertise to this position and the Center is looking forward to working with him.

Warm mix additives for various processes have been developed to allow asphalt mixtures to be mixed and compacted at lower temperatures with reduced binder viscosities and compaction temperatures. There are basically three different types of warm mix asphalt technologies, which include wax, foaming and chemical processes. There are currently many different products available for WMA



Figure 1. RHMA-G warm mix overlay

with more being developed. From the CP² Center's observations, WMA appears no different from HMA products without warm mix additives both during and post construction.

The Caltrans projects, shown in Table 1, used either Evotherm or Advera® as their warm mix additive for RHMA-G and RHMA-O. The District 3 projects produced the mix at standard temperatures to utilize the advantage of better compaction for the RHMA with cooler night time paving temperatures. District 3 is scheduled to place nearly 1,000,000 tons of warm mix asphalt rubber in 2011.

District 1 also has placed several warm mix projects in 2011. The project, Contract No. 01-499504 on Highway 1 south of Fort Bragg in Mendocino County, includes a RHMA-G warm mix overlay for both the NB and SB lanes and for all shoulders. The existing OGAC was raveling, and the District chose to grind and remove the OGAC and replace it with a thin lift of warm mix RHMA-G. Caltrans District 1 and Granite Construction worked together to place this RHMA-G warm mix overlay using Evotherm in cooler night time temperatures. Figure 1 shows Highway 1, in Mendocino County, with the new RHMA-G warm mix overlay. The project's technical report will be available on the CP² Center's website by October 2011.

The District 3 project, Contract No. 03-1F3704, on SR 99 in Sutter County, includes a dense graded HMA overlay using a PG64-16 binder, followed by a thin lift of rubberized hot mix asphalt open graded (RHMA-O) warm mix for the entire highway surface. Caltrans, District 3 and George Reed, Inc. placed the RHMA-O overlay using the warm mix additive, Advera®. The HMA materials were placed at typical paving temperatures with cooler night time paving temperatures, and the warm mix additive was used as a compaction aid with the RHMA-O. This rehabilitation strategy was used throughout the project. Figure 2 shows SR 99, Sutter County, north of Gridley, Calif., with the new RHMA-O warm mix overlay. The project's technical report will be available

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Figure 2. Highway 99, Sutter County north of Gridley; RH-MA-O with Advera®

on the CP² Center's website by October 2011.

The District 3 project, Contract No. 03-3C8904 on I-5 in Yolo County, includes a RHMA-G warm mix overlay for both the NB and SB lanes and for the shoulders. The existing OGAC was raveling, and the District chose to grind and remove the OGAC prior to placing 0.20 foot lift of warm mix RHMA-G to be followed by a thin lift of warm mix RHMA-O. Caltrans,

District 3, and George Reed Construction are working together to place these RHMA warm mix overlays using Advera® in cooler night time temperatures. This project is also using the warm mix technology as a compaction aid. Figure 3 shows the

job site on I-5, south of Williams while the new RHMA-G warm mix overlay was being placed on the SB No. 2 lane. The project's technical report will be available on the CP² Center's website by November 2011.

In conjunction with Caltrans, CalRecycle, and Industry, the

CP² Center will continue to do the following:

- **Develop a database for all projects.** Dr. Cheng and his students will continue to add projects into the database, which are included on the Center's website. www.ecst.csuchico.edu/cp2c/software/pptdb/
- **Conduct laboratory testing for warm mix projects.** The CP² Center will continue to test the warm mix HMA using our Hamburg test for moisture sensitivity and rutting resistance.
- **Monitor existing projects and develop and monitor new test projects.** CP² Center will continue to monitor projects including warm mix asphalt rubber chip seals.

The potential advantages of warm mix technology are less energy usage, lower emissions, and larger time windows to gain the necessary compaction during construction. These are desirable benefits for both the agencies and the contractors that choose to use warm mix technology for their HMA projects. Warm mix additives increase the cost of the mix approximately 3.5%, while a conservative estimate of one additional year of pavement life equates to a saving of approximately 10%.

If your company or agency is considering a WMA construction project, please notify the CP² Center so that we may monitor your project and add it to our database.



Figure 3. Dr. DingXin (Ding) Cheng (left), Director of CP² Center with Mohssen Ghassemi, R.E.

Caltrans Bloomington Crew continues "Innovative Pavement Strategy" in a demonstration for full-depth repair along main highway

By Kelly Dagnen for Ceratech

Figure 1. I-10 Freeway PCC panel corner break to be repaired.



Caltrans has continued its efforts to utilize innovative pavement recycling materials. On February 24, 2011, Kyle Dagnen (West Coast Manager from Ceratech Incorporated), along with Bob McDevitt (John Frank Construction), Cindy Mondary (Caltrans Road Supervisor) and Michael Nakame (Caltrans Area Superintendent) completed a full-depth corner break repair along the heavily trafficked I-10 Freeway West at the Live Oak off ramp. This was the

Caltrans Bloomington Crew's first experience with Ceratech's product line and the pioneering pavement preservation technique.

On the day of the repair, the surrounding temperature outside was 45° to 50°F. Ceratech personnel, Caltrans supervisors and the contractor had already surveyed the area. Upon inspection, they decided to do full-depth corner break on a PCC panel in the truck lane. The entire repair area was 6'x6'x9" thick. Because of its versatility, high performance, ease of use and high-strength granite extended package, Ceratech D.O.T.Line™ was the material chosen for this repair. The product is a single component powder, activated by water with 25 minutes working time, and will reach compressive strengths of more than 2,500 psi within two hours. Further, the product has the flexibility to be applied in temperatures ranging from 50° to 120°F and is a semi-leveling structural repair concrete.

The group first prepped the truck lane before saw cutting around the damaged area to create clean edges. The total prep time took approximately one hour. Foam board was then placed into the repair area to form the control joint. A two inch by four foot board was utilized as a temporary barrier until the area was backfilled with cold mix.



Figure 2. Repair site being prepped in the truck lane.



Figure 3. Ceratech D.O.T.Line™ being placed in prepared area.



Figure 4. Finished repair with Ceratech D.O.T.Line™ material.

Six units of the product were mixed in a concrete drum mixer and discharged into a wheelbarrow. For efficiency purposes, two mixers were used on this repair. The contractor added an extra quart of water in each batch to obtain the desired slump result. This provided a four to five inch slump and 20 minutes work time with the materials until initial set. The area was wetted down to guarantee high bond strength to the panel. In terms of time, the mixing and placement of material took approximately one hour total.

Afterward, the section was then finished using a two by four board to screed the material. Within two hours, the material had set and the team cleaned up the closure and reopened the area to traffic, illustrated in Figure 5.

This repair was organized as a presentation demonstrating a "Material in Place" Contract with the State of California. This product offers

much flexibility with swift results. The total repair time can be further reduced using additional personnel and/or mixers on site. After three months,

the repair has performed well with no sign of distress as shown in Figure 6.

Additional information regarding Ceratech's high-performance, alternative to traditional portland cement technology may be found on the company's website, www.ceratechinc.com or by contacting Kyle Dagnen directly: kyle.dagnen@ceratechinc.com, 949-274-2353.



Figure 5. Two hours after placement of Ceratech D.O.T.Line™ material. Completed repair with cold mix back-filled on area.



Figure 6. The repair after being in place for three months.

Caltrans District 11 completes rubberized emulsion aggregate slurry seal coat

By Leroe Lane and Brian Winter, CP² Center; and Gary Levine, Resident Engineer, and Sultan Ghazialam, Assistant Resident Engineer for Caltrans District 11

Caltrans District 11 has implemented an innovative preservation treatment using a rubberized emulsion aggregate slurry (REAS) seal. This pavement preservation project includes resurfacing of the EB and WB lanes, including the shoulders, with REAS for a 10-mile section of SR 76 near Rincon, Calif., in San Diego County. This is an eco-friendly maintenance treatment that uses approximately 100 recycled tires per lane mile in the REAS. The REAS seal coat consisted of an asphalt rubber emul-

sion that is mixed with water and Type III aggregate, as it is fed through the paver that mixes the products and applies a thin mat. The paver is equipped with a screed that includes augers and a squeegee to provide a smooth uniform surface texture. The rubberized emulsion consisted of SS -1 as a base emulsion with a crumb rubber and latex blend. The extender additives were added at the paver along with cement. The additives were added at a rate of

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Figure 1. REAS being applied with Bergkamp paver

five gallons per 150 gallons of emulsion to shorten the cure time of the REAS seal coat. The Type III aggregate was supplied at ambient temperatures. The REAS design was furnished by PMI.

Intermountain Slurry Seal, Inc. was the contractor for this project with Caltrans District 11 to place the rubberized emulsion aggregate slurry

(REAS) seal coat to preserve this section of rural highway. This section of highway was ideal for the REAS seal coat due to existing pavement being in good condition with only random transverse cracking and no visible rutting. Figure 1 shows the REAS seal coat being applied.



Figure 4. Existing condition of SR 76, San Diego County

The section for the REAS seal coat is from PM 42.6 to PM 51.7, while a control section with traditional Type III slurry, is from approximately PM 51.7 to PM 52.3, near the intersection of SR 79. Figure 2 shows the finished mat of REAS seal coat. With the thicker emulsion, the REAS seal coat has a smoother appearance and a quieter ride than a traditional Type III slurry seal.

The CP² Center did a preconstruction project survey confirming the condition of the existing asphalt concrete, and also noted that a chip seal had been applied approximately ten years ago using a poly-

mer modified binder. Figure 4 shows the existing pavement condition which is typical for the project limits.

The paver applying REAS ran at approximately three miles per hour with one laborer with a squeegee tool smoothing the joints at the startup points in the mat. The production rate was about 2½ lane miles per day with the rate being dependent on the nurse trucks turn around times as they re-filled with aggregate, emulsion, and water.

Construction took place from June 1 to June 18 between the hours of 8:00 A.M. and 4:00 P.M. The CP² Center worked with Caltrans District 11 to monitor the innova-

tion project during construction and will continue to monitor the project periodically throughout its life. Early indications show that the project is performing well and Caltrans District 11 personnel are pleased with the final product.



Figure 2. Surface appearance of REAS seal coat after traffic



Figure 3. Traditional slurry seal coat being applied

CIR under tough conditions

By Chuck Valentine, Valentine Surfacing Co.



Construction train showing tight conditions.

A Cold-in-place recycled (CIR) project has just been placed in Northern California, just southwest of Quincy, near Bucks Lake. The owner agency is the Central Federal Lands Highway Division out of Denver, Colo. The Prime Contractor

was Steve Manning Construction, Inc. out of Redding, Calif. and the CIR subcontractor was Valentine Surfacing Co. out of Vancouver, Wash. Albi-

na Asphalt, out of Klamath Falls, Ore., provided the engineered emulsion for the project.

This project is located in a heavily forested area of northern California. The CIR portion of the project occurred in three areas, with a total quantity of

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Construction train with finished mat on the left.



Recycling mix in windrow before laydown and compaction.

approximately 113,000 square yards. This road is heavily traveled by logging trucks and outdoor enthusiasts and has some very steep grades and sharp curves as well as shade areas due to the large number of trees. Also, there were very few places to stage equipment and turn around.

Despite all of these issues, the project has gone very well and the CIR material looks very good and is holding up well. The daily fog sealing and blotter application has worked very well to protect the recycled material from the heavy truck traffic and the shaded areas. The temperature cooled off very quickly at night and the morning temperatures were in the mid 30s, but climbed to the mid 80s during the day. As a result, the emulsion content has varied between 1.9 and 2.35%. The CIR work was completed on August 23, 2011, and the hot mix overlay will be completed by mid September.



Caltrans Pavement Management System update

By Tom Pyle, Caltrans

Over in the Pavement Program, we decided to catch our breath and celebrate a moment. Caltrans, UC Davis, the Department of General Services, and many others have been working for years to develop a contract to bring a consultant on board to create a Pavement Management System (PaveM) for Caltrans. The contract was finally awarded to Agile Assets, a company from Austin, Texas, that has written Pavement Management software programs for 16 other states. So we celebrated.

When running, PaveM will start with the existing condition of the pavements. Then it will combine data from many databases, such as the paving cost data from the Caltrans Office Engineer, and traffic data from the Division of Traffic. In the end, it will predict, for example, how long a one-inch asphalt overlay will last compared to a two-inch overlay and which strategy fits best for every job in a district. Ultimately it will be able to map out the best projects based on our Department's budget.

There will also be many other services PaveM will be able to perform, such as displaying pavement distress, mapping pavement thickness, and even showing photos of cores taken from around the state on a Google map. But give us a year to put it all together. We'll keep you posted on our progress. Table 1 summarizes the status of all the other efforts dealing with the PMS. Table 2 gives the timeline for planned operations.

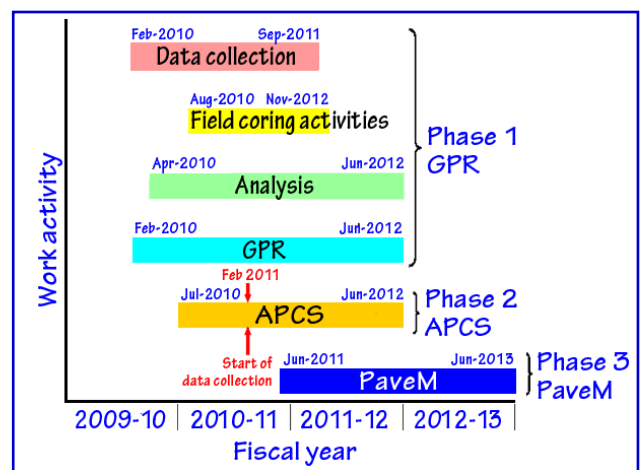


Table 1. Status of contracts dealing with the PMS
Main components

Ground Penetrating Radar (GPR)
<ul style="list-style-type: none"> Collected data in all Districts Data is being converted into pavement type and layer thickness GPR data is being supplemented and verified with core data
Automated Pavement Condition Survey (APCS)
<ul style="list-style-type: none"> Image-based distress to be used to develop performance curves New manual written to define distress types for automated collection Collected data in Districts 1, 2, 3 and 11 and now working in District 10
Pavement Management System (PaveM) software
<ul style="list-style-type: none"> Commercial off-the-shelf software for analysis of pavement projects One company has been selected out of four submitted bids Contract signed on June 30, 2011

But now the real work begins. The goal is to develop a user friendly computer program that will help us select the most cost effective, longest lasting paving projects, based on pavement preservation principles and the condition of the road. Agile Assets knows just what it takes to link into databases throughout the Department, collect data, and query it so that we make good decisions.

Table 2. Schedule for completion



Los Angeles County reviews performance of asphalt rubber warm mix chip seal demonstration project placed in August 2010

By Erik Updyke and Imelda Diaz, Los Angeles County Department of Public Works

The Los Angeles County Department of Public Works placed an asphalt rubber warm mix chip seal demonstration project on Smith Avenue in the unincorporated community of Acton on August 26, 2010 as reported in the Center's September 2010 newsletter. This project, which was proposed to the County by Intermountain Slurry Seal, Inc. (Intermountain), was the second project of this type Intermountain placed in California during the summer of 2010. The first project, in the City of Roseville, was placed in

June 2010 and was reported in the Center's June 2010 newsletter.

Smith Avenue is a local road that is approximately 2,200 feet long and 24 feet wide. One of the primary reasons Smith Avenue was selected was due to the variation in distress types and distress severity levels. Since transverse and map (block) cracking as well as alligator cracking are common types of distresses found in the roads in North Los Angeles County, this project allowed us to examine the effectiveness of the warm mix chip seal in sealing these

types of distresses. Prior to the chip seal application, the average pavement condition index (PCI) of Smith Avenue was 46, putting it in the "poor" condition category. The predominant distresses consisted of moderate transverse cracks ($\frac{1}{4}$ " – $\frac{1}{2}$ " wide) occurring extensively (60-80%). One segment (660 feet long) had moderate to severe alligator cracking. The "before" photos of Smith Avenue are shown in Figures 1 and 2.

The asphalt rubber (AR) chip seal construction generally followed the specifications in subsections 203-12 and 302-10 of the Greenbook for an asphalt rubber and aggregate membrane (ARAM). The application

rates for the AR warm mix binder containing 18% crumb rubber were between 0.60 and 0.66 gal/yd². The placement temperature of the AR warm mix binder was 335°F, considerably lower than the application temperature range of 375°F to 425°F specified in the Greenbook. The warm mix additive

supplied was manufactured by Engineered Additives and blended at 1.5% by weight of the asphalt rubber binder. The "chips" ($\frac{3}{8}$ -inch pre-coated screenings) were applied at rates between 32 and 34 lbs/yd². A Type II microsurfacing was placed over the chip seal in September, 2010. The finished surface of the chip seal is shown in Figure 3.

Since this demonstration project was placed, the performance of the asphalt rubber warm mix chip seal and type II Microsurfacing has been monitored. In the fall of 2010 cracks developed on the surface. The weather in the Acton area during that time was unseasonably cold. On January 24, 2011, County and CP² Center staff reviewed the project and observed extensive cracking. The cause was unclear. Was the cracking top down, perhaps thermal cracking, or bottom-up, reflective cracking? In order to determine the cause of the cracking, it was decided that cores would be taken during warm weather.

On July 26, 2011, cores were taken and the pavement condition was re-evaluated. A total of three cores were taken, two cores between Soledad Canyon Road and Crown Valley Road, and one just west of Crown Valley Road. Based on the cores, the existing pavement consisted of over 5½ inches of asphalt concrete and "soil mix" (a mixture of native soil and cutback paving asphalt) pavement. The pavement section was thicker than records indicated.

Cores were taken through cracks such that the crack was through the middle of each core, resulting in a total of six edge locations that could be observed. The first core partially split apart during extraction. The cracks at the two edge locations did not propagate through the ARAM. The northerly crack of the second core appeared to go through the ARAM, but not the southerly crack. The third core was extracted using tongs. Once again, the cracks at the edge locations did not propagate through the ARAM. In summary, five of the six cracks in the edge of the cores did not reflect through the ARAM. Figure 4 shows some of the cores.

In addition to the cores, a pavement condition evaluation was also conducted. After almost one year from the date of the chip seal construction, the calculated PCI is now 71, which puts it in the "fair"

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Figure 1. Before the chip seal, Smith Avenue west of Crown Valley Road.



Figure 2. Before the chip seal, Smith Avenue between Soledad Canyon Road and Crown Valley Road.



Figure 3. Finished chip seal surface, Smith Avenue west of Crown Valley Road.



Figure 4. Cross section of the cores; note the cape seal on the top.



Figure 5. Smith Avenue after one year of performance:

The upper photo was taken west of Crown Valley Road. Slight hairline longitudinal and transverse cracks.

Below, on Soledad Canyon Road and Crown Valley Road, no alligator cracking is observed.



condition category. Except for slight hairline transverse cracks occurring throughout, no alligator cracking was observed. The widths of the transverse and longitudinal cracks were reduced from 1/2 inch or greater to slight hairline cracks (<1/4 inch), and the extent or occurrence

of the transverse cracks was reduced by 40 to 50 percent. As a result, the treatment increased the PCI by 25 points. Since no pavement preparation was performed prior to the placement of the chip seal, the improvement to the pavement condition was even more impressive. Recent "after" photos taken almost one year later at the same locations are shown in Figure 5.

Based on observations of the pavement condition and cracking in the cores taken, the asphalt rubber warm mix chip seal has shown that it can effectively seal moderate transverse cracks, retard moderate alligator cracking from reflecting up, and be a smooth durable wearing surface when combined with microsurfacing. To date, this project has performed satisfactorily and has exceeded our expectations.

It should be noted that this project was intended to be a demonstration project and was not intended to provide a strictly controlled, quantitative performance comparison to asphalt rubber chip seals placed without warm mix additives. For more information on this project please contact Erik Updyke at eupdyke@dpw.lacounty.gov.



Microsurfacing assists with repairing early pavement problems in Elk Grove, Calif.

By Mike Marchini, California Pavement Maintenance (CPM) Company

On November 17, 2009, Mike Marchini, VP of CPM, received a phone call from Steve Genereux, Project Manager of RGW Construction, Inc. Steve explained that 840,000 SF of newly placed Rubberized Hot Mix Asphalt (RHMA) on the Sheldon Road/Highway 99 Overcrossing Project was showing some areas of concern. The project had been funded by the City of Elk Grove through a joint effort with the State of California's Department of Transportation (Caltrans) to remove the narrow two lane overcrossing that was currently in place. The overcrossing would then be replaced with a brand new six lane overcrossing with new entry and exit ramps. The project, in general, seemed to be a huge success and greatly improved traffic flows and access. However, there was one additional issue that had to be addressed.

Steve explained that pavement surface issues had developed shortly after the final surface course (RHMA) was placed. The surface course was shedding stone in isolated areas and there was a concern that the surface would need a specialized solution to prevent further stone loss. Steve wanted to know what CPM's toolbox might be able to provide to stop any further deterioration. As the conversation developed, it became obvious that a well placed, specially designed microsurfacing might be the answer.

In order to better assess the situation, CPM visited and reviewed the site to see firsthand what corrections might actually entail. After driving several sections of the newly placed HMA, it became clear that something more significant than just microsurfacing would have to be done. While isolated at that time, there were some areas where the "shedding" had progressed to the point where actual repairs might be needed prior to any surface treatment.

Over the past few years CPM had successfully resolved/repared other paving issues with microsurfacing, but none quite as challenging as this one. With site conditions in mind, it was recommended that some asphalt repairs be performed in the more significantly eroded areas and then a high performance microsurfacing could be placed over the entire project, including the repaired areas. CPM would also recommend a test section be placed. The decision was made for CPM to mobilize a small crew to the site that afternoon to lay a test section of microsurfacing in a small area to ensure it would do the job. This would allow all interested parties to be assured that this was the "right" answer to the problem. Placement of the microsurfacing trial area began just before sunset that evening and was opened to

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traffic approximately 25 to 30 minutes after completion of application. Upon review of the microsurfacing application the following morning and for days to come the results looked promising! Looking promising didn't make the paperwork move any faster though and the microsurfacing was sidelined for a while as all parties involved came to a final resolution on how to proceed with a solution.

After a short period, a final decision/solution was reached between the City of Elk Grove and all parties involved. The areas that showed signs of failure would be ground out and replaced with dense graded hot mix asphalt. In order to finalize these exact areas of repair, RGW met with representatives from the City of Elk Grove and conducted a thor-

ough analysis of the surface and designated all the areas that would require dense graded hot asphalt repairs. Bill Moody (Area Manager, RGW) then informed CPM they would be the contractor to perform the microsurfacing.

Outside of the specialized task of fixing an RHMA paving project with microsurfacing, other significant obstacles presented themselves. High traffic counts would normally have constituted the use of a Type III microsurfacing. With residential neighborhoods fronting this roadway, the City of Elk Grove had concerns with what they felt could be a potential noise increase from the rougher surface texture of a Type III microsurfacing. Thus, a Type II was selected and the challenge of using a thinner/lighter material added complications. Changes in the mix and application would have to be made by CPM to address this issue. Moreover, as huge counts of commuter traffic used this overcrossing and the entry and exit ramps daily, it was apparent that the microsurfacing would have to be placed at

night, further limiting how and when the surfacing could be applied.

After the dense graded HMA repairs had been made, CPM mobilized a specialized microsurfacing crew to the site on Sunday night, July 25, 2010, led by Operations Manager, Ryan Bangle and microu-



Nighttime construction

facing superintendent Ricardo Lopez. The microsurfacing emulsion was designed by Paramount Petroleum's Elk Grove Facility. The emulsion contained upwards of 5% Latex based residual asphalt as well as other key proprietary ingredients to the microsurfacing emulsion blend. Additionally, CPM selected a finer gradation of Type II aggregate to be applied enabling the material to penetrate into the voids of the RHMA

surface for more thorough bonding and protection of the existing mix. The finer aggregate gradation would both create a smoother surface and help lessen the noise to adjacent homes.

CPM began by laying a few trial areas on one of the three less trafficked side streets off of Sheldon Road, which were to also receive microsurfacing. After a few hours of adjustments and evaluations, CPM was confident with the material settings they would apply. By night two, CPM had completed the microsurfacing on all the side streets and had moved to the heavily trafficked lanes, entry and exit ramps, and the intersections of realigned Sheldon Road. Even with the material being applied in the prime time of summer, fine raveling occurred each morning, due to night-time material application. CPM was prepared for this and had brooms on site early each morning to sweep up any loose ravel from the travel way as well as gutter pans and sidewalks. Great attention to detail was also paid to lane lines, radiuses and gutters as CPM was not only repairing the surface, but also striving to make the overall appearance "as close to perfect as possible." The City of Elk Grove needed to feel confident in their decision of utilizing microsurfacing as a final surface for the project. Thorough planning, hard work and attention to detail allowed CPM to complete the 840,000 SF of the Sheldon Road/ Highway 99 Overcrossing Project in only five nights.

A large part of the success was the "care and feeding" of the project from the mix design process to the application. CPM was asked for a solution to resolve a potentially bad problem and while a standard microsurfacing might well do the job, the enhanced micro would insure success even under difficult nighttime obstacles. Performing the work in a careful, cautious and professional manner is certainly half the battle, but giving the material the additional "horsepower" necessary to insure success was an important key. Doubling the polymer content of the emulsion wasn't called for by specifications, but sometimes doing the job right is like building character, it's what you do when no one else is looking that makes the difference.

To date, the project is a huge success in the eyes of the Motoring Public, the City of Elk Grove and all parties involved.



Finished product



Close-up of finished project

The pothole report: can the Bay Area have better roads?

By Metropolitan Transportation Commission (MTC) Staff



Can the San Francisco Bay Area have better roads? This is the question that the local streets and roads officials are hoping will be answered at the upcoming *Plan Bay Area*, the regional transportation plan discussion and the title of a new publication released by MTC. As part of the annual regional pavement condition report, MTC has also incorporated in this report an update of the first Pothole Report dated March 2000. Following is the executive summary:

The condition of pavement on the Bay Area's local streets and roads is fair at best. The typical stretch of asphalt shows serious wear and will likely require rehabilitation soon. The region's average pavement condition index (PCI) score is now 66 out of a possible 100 points. This is far closer to the 60-point threshold at which deterioration accelerates rapidly and the need for major rehabilitation becomes much more likely than to the 75-point score that MTC established as a target for roadway quality in its long-range Transportation 2035 Plan adopted in 2009. Indeed, despite efforts by the Commission and the region's local governments, overall conditions on our 42,500 lane-miles of city streets and county roads essentially are the same as

reductions and to develop the Sustainable Communities Strategy mandated by State Senate Bill 375 (Steinberg, 2008), the time is right for an updated analysis of the region's local streets and roads.

Fresh data, new developments

Building on the foundation established in MTC's original Pothole Report, published in 2000, this update includes both a primer on the cost and life cycle of pavement and a comprehensive look at the current state of the Bay Area's local streets and roads network, featuring a jurisdiction-by-jurisdiction ranking of the 2010 pavement condition index (PCI) scores of the region's nine counties and 101 cities. This report also provides a briefing on two important new developments in the pavement management field:

- **Cold recycling:** a relatively new and highly promising technique that has been shown to cut asphalt rehabilitation costs by 20 to 40 percent, and to reduce greenhouse gas emissions from pavement repair projects by eliminating the need to produce new paving material or transport it to the worksite.
- **Complete streets:** an increasingly popular design approach for urban neighborhoods in which the entire streetscape, from sidewalk to sidewalk, is geared for safe access and use by pedestrians, bicyclists and transit riders as well as motorists. Common elements typically include bike lanes, sidewalk bike racks, transit stops, pedestrian signals, street trees and curb ramps. Building Complete Streets requires a somewhat larger construction investment, but the benefits of this spending are spread to a wider spectrum of road users.

Projected pavement conditions in 2035 based on annual expenditure level scenarios

	Existing funding	Maintain current pavement condition	Improve conditions ¹
Average regional PCI ² in 2035	45	66	75
Pavement condition	Poor	Fair	Good
Average annual expenditure level ³	\$351 million	\$740 million	\$975 million
Annual expenditure/ lane mile	\$8,000	\$17,000	\$23,000
Increase over current expenditure level (%)	0%	110%	177%

¹ Improvements do not include complete street-type upgrades.

² PCI is the pavement condition index (scale of 0 to 100 with 100 being highest PCI)

³ Average annual expenditure level assumes a three percent inflation rate.

they were in 2001, a decade ago. Improved pavement quality can play a small, but important, role in meeting state targets for curbing greenhouse gas emissions. Not only does better pavement promote better vehicle fuel economy (and hence fewer emissions), but also low-cost preventive maintenance requires less asphalt and fewer heavy truck trips than major roadway rehabilitation projects. Also, new, cleaner application methods can cut down on emissions. As the Bay Area works to achieve state targets for greenhouse gas emission

Scarce funding puts premium on prevention practices

Funding for roadway maintenance typically comes from a range of sources, including the state gasoline tax, county sales taxes, and local sources such as city or county general funds, bonds and traffic-impact fees. But as the need for maintenance grows, the available funding from these sources has been shrinking. Not only are general fund contributions declining, but the state gas tax loses an average of three percent of its purchasing power each year due to inflation. County transportation sales taxes typically dedicate less than 25 percent of revenues to local streets and road maintenance, and receipts from these taxes have fallen sharply in recent years due to the deep economic recession that began in 2007.

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To help cities and counties get the “biggest bang for their bucks,” MTC has long advocated pavement preservation. A municipality that spends \$1.00 on timely maintenance to keep a section of roadway in good condition would have to spend \$5.00 to restore the same road if the pavement were allowed to deteriorate to the point where major rehabilitation is necessary. All 109 Bay Area jurisdictions, and over 300 public agencies nationwide, now use MTC’s StreetSaver® pavement management software to inventory their street networks, determine maintenance needs and devise maintenance programs based on available revenues.

Fixing the fiscal pothole

While pavement quality has rebounded slightly in recent years and now stands about where it did a decade ago, the challenge of boosting the regional average to “good” (a key goal of MTC’s *Transportation 2035 Plan*) is more daunting — and more expensive — than ever. MTC estimates that meeting the Transportation 2035 goal of a local street and road network in “good” condition (average PCI score of 75) will require \$25 billion, or \$1 billion a year through 2035.

This level of investment is nearly three times higher than the current \$351 million spent annually by all sources on roadway maintenance. Fixing this fiscal pothole will be a key local and regional challenge as we move toward adoption of *Plan Bay Area*, the comprehensive regional plan that will guide transportation investment in the nine Bay Area counties through 2035.

For a copy of the MTC’s *The Pothole Report: Can the Bay Area Have Better Roads?*, please contact the MTC-ABAG Library by e-mail: library@mtc.ca.gov, or telephone (510) 817-5836.



2010 Climate Initiative Innovation Grant Program

By Steve Urbanek, P.E., County of Sonoma

Every form of transportation used today utilizes the most basic kind of public infrastructure: our roads. Methods of transportation such as mass transit, air, and rail systems are made accessible to the public by roadways and are only possible if our road networks are sustained. Bicycles, pedestrians, buses, and vehicles rely on roads daily for purposes both fundamental and recreational. Keeping the roads in usable condition has become as challenging as it is essential.



CIR laydown adjacent to existing distressed pavement

The purpose of the Climate Initiative Innovation Grant is to test innovative transportation strategies that can be implemented quickly and have significant potential to result in measurable greenhouse gas emission reductions and can be replicated on a larger scale in the Bay Area region. The City of Napa and the County of Sonoma were recipients of a grant from the Metropolitan Transportation Commission

(MTC) to test the use of cold-in-place recycling (CIR) to meet the objectives of the program.

CIR has been used since the 1980s. The states of Oregon and New Mexico were early users of this process. Since then the use has expanded greatly throughout the United States and the world. The State of California (Caltrans and local agencies) are using CIR techniques more and more to address a need for maintaining their pavement networks. The in-place treatments generally consist of milling two

to four inches of the existing pavement, mixing the millings with an asphalt emulsion, and relaying the material with standard paving equipment and techniques. The compacted surface is normally topped with a final wearing surface like a chip seal or a thin hot mix layer.

The benefits of CIR are many. The first is the reuse of legacy aggregates and asphalt binders in the existing asphalt and minimizing the need for the production of new aggregate and binder materials. The source reductions often result in a nearly 80% reduction in greenhouse gas emissions over more conventional road rehabilitation treatments. There is also a reduction in emission associated with the hauling and disposal of road materials by heavy equipment. The efficiency of the CIR process also results in emission reductions from improved traffic congestion management associated with road closures and traffic control detours and delays.

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CIR in Palm Springs

The following points demonstrate the Napa/Sonoma Project's ability to meet the MTC program goals:

- Public Works Departments will become stronger partners in the climate initiative by embracing new strategies and solutions such as cold in-place recycling technologies. Such methods reduce the impact of managing transportation systems used by all modes of travel on the environment while operating in a financially constrained setting. Historically, jurisdictions in the Bay Area have used maintenance techniques that have not changed appreciably in 50 years and produce significantly greater greenhouse gas emissions than will the proposed cold-in-place recycling project.
- The Napa/Sonoma Project, as proposed in the application, would remove over 2.1 million pounds of CO₂ from the air. For example, if only 30% of the streets in the Bay Area which are in the candidate PCI range for the use of this technique were treated, over 389 million lbs of CO₂ would be eliminated from the Bay Area air. This is equivalent of over 32,000 cars being eliminated from Bay Area roads and freeways.
- The Project is easily scalable to available funding because it does not require the purchase of specialized equipment. While equipment purchase remains an option, emissions reductions are possible through the use of the competitive bidding process.
- Education as to the cost-effectiveness of this technology is a key to its replication in the Bay Area. The demonstration aspect of this project is a vital component in the education of the 109 Bay Area Public Works agencies in understanding the cost savings and emissions reduction of this technique. Also included in the target audience would be the Bay Area Contracting Community waiting on the



CIR project near Lake Arrowhead, Calif.

sidelines to purchase the necessary equipment once the competitive environment is created through the public sector demand for this technology. Our public works colleagues have expressed an interest in this demonstration project and have indicated that they want the Napa and Sonoma projects to move forward so they can evaluate their value on roads similar to theirs before accepting it themselves.

The project is scheduled for construction in late September 2011. The project includes 2 miles of Adobe Road, between Corona Road and Old Redwood Highway North in Sonoma County. The City of Napa proposed Solano Ave, South Freeway Drive and Golden Gate Drive for their portion of the project. Workshops on the CIR process and on specification development will also be provided under the grant to The City of Napa/Sonoma County. For more information on the project, please contact either Stephen Urbanek, Pavement Preservation Manager, Sonoma County, steve.urbanek@sonoma-county.org, (707) 565-3884; or Marlene Demery, Special Project Manager, City of Napa, mdemery@cityofnapa.org, (707) 257-9520.



Steve Mueller

RMWPPP to meet in Reno, Nev. October 4-6, 2011

By Steve Mueller, FHWA Liaison to the RMWPPP

The Rocky Mountain West Pavement Preservation Partnership (RMWPPP) is a broad-based group of pavement preservation professionals from State and Local governmental agencies, industry, academia, consultants, and the Federal Highway Administration (FHWA) covering 13 Western states. The partnership provides an important venue for preservation leaders to interact and tackle important regional challenges regarding pavement preservation. It is one of four regional groups that are

active in the country; there are other groups in the Midwest, Northeast, and Southeast. The partnerships recognize that we all must work together to protect and preserve our existing roadway infrastructure in a state of good repair.

The stated mission of the group is to:

Provide an ongoing regional forum for Pavement Preservation, with the intent of sharing and exchanging information and data concerning research, design, specifications, materials, construction practices, cost analysis, management systems, and methods of promoting the benefits of Pavement Preservation through education and application.

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Some of the challenges of the RMWPPP are the large geographic area which it covers and the costs of member travel to the meetings. It is particularly difficult for Local Government and representatives from academia to obtain travel funding. The National Association of County Engineers (NACE) has appointed a representative to the RMWPPP and the other regional partnerships to help provide regular communication links to their members. In Denver, the Metropolitan Government Pavement Engineers Council (MGPEC) supports the travel of its chairman to the meetings. Other metropolitan groups, MPOs, LTAPs, or associations may also want to consider having representation on the RMWPPP. At the State level, the American Association of State Highway and Transportation Officials (AASHTO) helps to support their State DOT members' participation in the RMWPPP through the Transportation System Preservation Technical Services Program's (TSP²) voluntary contributions. Recognizing the importance of preservation, 38 states currently provide support to this program at the national level. Fourteen industry members of the partnerships also provide support at the national level, and many more through the individual regional partnerships.

There are currently three task forces established by the RMWPPP Steering Committee: Specification Guidelines; Communications; and Promoting Pavement Preservation. The Specification Guidelines Task Force is currently working on the development of a standard specification for chip seal emulsions that can be adopted by member agencies to help improve the performance of their chip seal projects. This should lead to more cost-effective solutions for our members. The Communications Task Force is working to provide regional definitions for the terminology that is commonly used by the preservation professionals within the RMWPPP. Variations in the terminology are a common source of confusion about issues that impact our members. Finally, the Promoting Pavement Preservation Task Force has developed a PowerPoint presentation that is currently

being used throughout the region to help educate interested councils, commissions, and citizen groups about pavement preservation. A copy of this presentation can be downloaded at this website: <http://www.tsp2.org/pavement/rmwppp/>



You are invited to join the group and attend the 2011 RMWPPP Annual Meeting which will meet in Reno, Nev. from October 4-6, 2011. The meeting will feature a roundtable discussion by four State DOT executives about the value of pavement preservation from an agency executive's perspective. Susan Martinovich (NDOT), Carlos Bracerias (UDOT), Brian Ness (ITD), and Cathy Nelson (ODOT) have agreed to participate in the meeting. In addition, there will be presentations by a cadre of national leaders in the preservation movement, presentations from the individual members, and presentations concerning the deliverables that have been developed by the three task forces. More information about the meeting, including a registration brochure with the complete draft agenda is available at this website: www.tsp2.org/pavement/rmwppp/annual-meetings/2011-2/

Membership in the partnerships are open to individuals, agencies, companies, associations, academic institutions, and others involved with pavement preservation. Prospective members should contact the National Center for Pavement Preservation (NCPP) by telephone at (517) 432-8220 or by e-mail at ncpp@egr.msu.edu.

If you have questions regarding the RMWPPP, please feel free to contact Steve Mueller, FHWA Pavement and Materials Engineer, at Steve.Mueller@dot.gov.



FP² Inc. Update

By James Moulthrop, Executive Director

The FP² board of directors held their semi-annual meeting during the AASHTO Subcommittee on Maintenance meeting in Louisville, Ky., on July 19. The current officers' terms expire at the end of 2011 and a nominating committee was formed to provide a slate of officers for the next two years.

FP² agreed to a three year agreement with Michigan State University to support the National Center in place of the current one year agreement. During the meeting the board was updated on the prog-

ress and direction of activities related to the re-authorization of SAFETEA-LU by a conference call with our advocacy firm in Washington, Williams and Jensen. In addition, Larry Galehouse of the National Center briefed the board on progress for the 2012 National Conference in Nashville, Tenn. and the National Media Campaign to spread the word about the need to keep good roads good.

The latest news from the legislative front is that the Senate Environment and Public Works Committee, chaired by Senator Barbara Boxer (D-CA), intends to have a re-authorization bill for review after Labor Day. We are informed that the Senate bill will contain Asset Management language which should

Continued, next page

include aspects of pavement preservation; but until the bill is released we will not be in a position to comment on the legislation. It is very important that you contact your Representative during the coming month to solicit their support for language that includes pavement preservation.

FP² will be participating in Regional Pavement Partnership meetings this fall in Reno, Bismarck, and Boston and the American Public Works Congress in Denver.

Four applications for the 2011 James B. Sorenson Excellence in Pavement Preservation Award have

been received and the award will be presented to the winner during the Rocky Mountain West meeting in Reno.

Planning continues for the 2012 National Pavement Preservation Conference with the Organizing, Technical, and Demonstration Committees holding timely Go-To-Meeting sessions to identify plenary session topics and speakers. Demonstrations of preservation techniques are planned and a ribbon cutting will be a part of the activities. A spouses' program will include shopping and a visit to historical venues in the Nashville area.



Upcoming events

SEPTEMBER 2011

18–21: APWA 2011 Show, Denver, Colo.

www.apwa.net

21–23: League of California Cities Annual Meeting, Moscone Center, San Francisco, Calif.

www.lccannualconference.com

26–30: XXIV World Road Congress, Mexico City, Mexico.

<http://aipcrmexico2011.org/>

26–28: Intensive Course on Mechanics of Tire-Pavement Interaction, Delft, Netherlands.

www.skidsafe.org/index1.html

OCTOBER 2011

4–6: Rocky Mountain West Pavement Preservation Partnership, Reno, Nev.

www.tsp2.org/rmwppp

11–13: Second International Conference on Warm Mix Asphalt, St. Louis, Mo.

email: matthew.corrigan@fhwa.dot.gov

13–17: AASHTO 2011 Annual Meeting, Detroit, Mich.

www.transportation.org/

18–21: Northwest Pavement Management Conference, Portland, Ore.

www.nwpma-online.org

25–26: AEMA Emulsion Technology Workshop, St. Louis, Mo.

www.aema.org/downloads/AEMA2010n3.pdf

27: California Asphalt Paving Conference, Sacramento, Calif.

Contact Russell Snyder at 916-791-5044

27–28: Fifth Asphalt Shingle Recycling Forum, Dallas, Texas

www.shinglerecycling.org/

NOVEMBER 2011

3: Asphalt Pavement Conference, Ontario Calif. For more information contact Ann St. Martin at

astmartin@acaca.org or call 949-855-6489

3–5: Fifth Rubber Modified Asphalt Paving Conference, Austin Tex.

www.rubber.org/5th-rubber-modified-asphalt-conference

7–8: ARRA 2011 Semi-Annual Meeting, Portland, Ore.

www.arra.org/

14–15: AEMA Asphalt Emulsion Technologies Workshop, St. Louis, Mo.

www.aema.org/

15–19: 8th International Conference on Managing Pavement Assets, Santiago, Chile

www.icmpa2011.cl or email: icmpa2011@uc.cl

28–Dec. 2: ACPA Annual Meeting, Indian Wells, Calif.

www.pavement.com



Center news

Alaska Pavement Preservation Project

The Center is continuing to make good progress on the development of a pavement preservation program for the State of Alaska. We have submitted a roadmap for integrating pavement preservation into the asset management program, completed a draft of the results of a literature review on the use of pavement preservation treatments in cold regions, and developed a pavement preservation database which is currently being populated. We are currently developing a strategy selection program for treatments to be used in Alaska, guidelines for integrating pavement preservation into the Alaska pavement management program and more. Ding Cheng visited Alaska in early August to review progress on several of the project tasks and to visit some pavement preservation projects in the northern and central regions. The Center is working with Hannele Zubeck of UAA and Jenny Liu of UAF on this project. The project is scheduled to be completed by the end of 2011.

CalRecycle projects

We continue to work on two projects for CalRecycle dealing with asphalt rubber and terminal blends. The first project deals with the use of warm mix additives with asphalt rubber and terminal blends for chip seals and hot mix asphalt. A number of projects have been constructed in Caltrans Districts 1, 3, and 9. Some of these are being monitored under this contract while others are being monitored directly for Caltrans. The use of warm mix is growing fast with asphalt rubber and terminal blend products. The advantages, according to the users, are improved compaction, longer hauls, reduced energy and reduced emissions. The short term performance of these products is very promising. We still need to monitor them for long term performance.

The second project deals with the cost effectiveness of asphalt rubber or terminal blends when used in chip seals or in hot mix asphalt. An interim report has just been completed on the cost effectiveness of asphalt rubber

Figure 1. Asphalt Paving Analyzer for Hamburg Wheel Track Testing and other mix property research



Figure 2. Superpave Gyratory Compactor for creating asphalt mix samples

in this application. The results clearly show asphalt rubber to be cost effective in most applications. We are now working on the cost effective portion of the work dealing with terminal blends. We continue to look for performance data for this product in chip seals and terminal blends. If you have information on the life of these products, please let us know.

Caltrans training contract

We have completed a survey of Caltrans engineers on the need for training in the areas of design, construction, materials and maintenance. The results of the survey should be posted to our website in the very near future.

New asphalt laboratory

The Center now has a new asphalt laboratory. Funds from CalRecycle and from Industry have been used to purchase the Superpave Binder equipment and mix equipment including the Gyratory compactor (Figure 1). We have also upgraded our APA device so it can perform Hamburg wheel tracking tests (Figure 2).

In addition, the US Forest Service Regional Lab in Missoula, Mont., closed and we were able to get considerable conventional binder testing equipment from them. Steve Monlux, formerly the regional materials engineer, helped arrange this transfer of equipment. We have considerable equipment, but are still looking for space to house it. Some of our equipment is located at the Knife River facility in Chico. Knife River also contributed to the upgrading of the APA testing device which can perform Hamburg Wheel Track Testing, as well as rutting testing.

