



# CP2 CENTER News

Newsletter of the California Pavement Preservation Center

No 6

June 2008

## Pavement Preservation Conference held in Newport Beach

by Mary Stroup-Gardiner, CP2 Center



Awards were presented at the April conference to Shakir Shatnawi, Gary Hildebrand and Bill Robertson for significant contributions in the field of pavement preservation.

Over 330 representatives from local, regional, state and federal agencies, industry and academia attended the Third Annual California Pavement Preservation Center conference held April 9-10 this year in Newport Beach, California. Participants shared their considerable expertise and wide-ranging experience in the areas of pavement preservation for both flexible and rigid pavements. Over 30 exhibitors were on hand to share their knowledge on specific pavement preservation treatments and techniques. All of the presentations made at the conference can be found at the California Pavement Preservation Center website: [www.cp2info.org/conference](http://www.cp2info.org/conference).

One highlight of the conference was the first annual presentation of the Pavement Preservation Task Group awards. The nominating committee presented eight awards in three categories: Individual Award, Program Award, and Project Award. Individual Awards were presented to three people whose contributions of time, effort and dedication has resulted in significant contributions through enthusiastic, visible and tireless promotion of pavement preservation.

The first award was presented to Shakir Shatnawi. Dr. Shatnawi is the co-founder of the Pavement Preservation Task Group (PPTG), whose work on the Maintenance Technical Advisory Group manual was of such a high standard that the Federal Highway Administration elected to adopt the documents for national use. Without Dr. Shatnawi's vision, innovation and dedication, there would have not been a PPTG. Dr. Shatnawi also recognized the need for education, technical assistance and independent assessments of innovation projects, which led to the establishment of the California Pavement Preservation Center at CSU, Chico.

The second Individual Award was presented to Gary Hildebrand. Mr. Hildebrand is also a co-founder of the Pavement Preservation Task Group. Mr. Hildebrand has used his years of Caltrans experience to make the MTAG manuals and workshops the high quality products they are today. His tireless promotion and recruiting of exceptionally qualified volunteers from industry and agencies alike makes pavement preservation activities visible to the public.

The third Individual Award was presented to Bill Robertson of the City of Los Angeles. Mr. Robertson displays an exceptional understanding of what it takes to implement pavement preservation. His community communication programs and methods serve to educate both the decision makers and the general public about the needs, options and benefits of pavement preservation programs. He has used innovative processes and materials to preserve, maintain, and rehabilitate more roads per dollar spent. Mr. Robertson spoke at the conference and generously shared his experiences in implementing pavement preservation with conference participants.

Three Program Awards were presented to agencies whose use of progressive pavement preservation techniques resulted in documented benefits of pavement preservation while at the same time provided the best maintenance to construction dollar ratio.

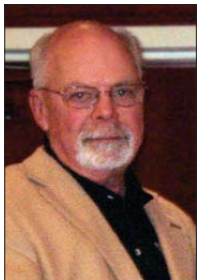
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Pavements are important to the City of Lakewood. Left to right are Carlos Rodriguez of Silvia Construction, Council member Larry Van Nostran, Mayor Steve Croft, Council member Diane DuBois, Vice mayor Todd Rodgers, Council member Joe Esquivel, Assistant Public Works Director Max Withrow.



From the top: Pat Giles, Bob McCrea and Mayor Steve Croft accepted program awards for Contra Costa County, Lake County and the City of Lakewood, respectively.

The first Program Award was presented to Santa Barbara County for their use of a pavement preservation program developed in 2001. This program was funded using monies from Measure 'D', which implemented a half cent county wide sales tax to be used to maintain roads. The cost savings from their pavement preservation program allowed them to spend future monies on Level 3 and 4 roadways while still maintaining an aggressive pavement preservation program. The Pavement Preservation Program was initiated in two phases. Phase 1 placed a number of miles of a cape seal (scrub seal followed by a type II microsurfacing). Phase 2 used rejuvenating fog seals for roadways not covered by the cape seal.

The second Program Award was presented to Contra Costa County for their Pavement Preservation Program which, with 750 lane miles, has one of the best pavement condition indexes in the Bay Area. In 2007, over 1.2 million square yards of pavement surface were treated with one of four surface treatments: polymer modified emulsion chip seals, asphalt rubber chip seal, asphalt rubber cape seals, and slurry seals. The majority of the work is done by in-house maintenance forces; the application of the asphalt rubber is contracted out. Work not done by county forces is sent to the Design Division for development of plans and specifications, then passed on to the Construction Division for advertising, award and oversight.

The City of Lakewood was the recipient of the third Program Award. The City demonstrated its political will in using funds to resurface approximately 80% of their street mileage with rubberized asphalt concrete. The City of Lakewood managed to reduce their annual maintenance budget of \$180,000 to \$75,000 with this program.

The two Project Awards were presented for projects that have demonstrated significant advances in the development and use of new technologies which resulted in significant favorable public comments.

The first Project Award was presented for the 2007 Lake County Cape Seal Project, Buckingham and Riviera West Subdivisions. The funding for this proj-



Jeff Smith accepts an award presented by Hans Ho to the City of Watsonville for their chip seal project.

ect was provided in part by the zone of benefit for the "Enhanced Road Maintenance." The total budget was \$753,170; the final contract amount was \$373,219. Partners for this project were Emulsion Technology, Western Emulsions, Inc., Graham Contractors, Inc., and Pacific Enzymes.

The second Project Award was presented to the City of Watsonville for their 2005 Chip Seal Innovation project. Twenty-seven roadways throughout the city were selected for a three part surface treatment. The majority the roadways had PCI values less than 50, with more than half below 40 PCI. A microsurfacing application was used as a low budget leveling course, followed by an asphalt rubber chip seal, and a Type II slurry seal for the final sur-



face. The contractors for this project were International Surfacing Systems/Western States Surfacing, Valley Slurry Seal and Chrisp Company.

John McGray displays the Program Award earned by an exemplary program in Santa Barbara County.



## Interview with Phil Demery, Sonoma County Director of Public Works



**P**hil Demery is currently the Director of Public Works for Sonoma County. He formerly served in the same position at Santa Barbara County. We interviewed Phil in April, 2008, to discuss his plans for pavement preservation in Sonoma County.

### What is Sonoma County currently doing with respect to pavement preservation?

I was hired by Sonoma County in May of 2007. For the past three years, Sonoma County's roads have been identified as having the worst average PCI in the nine Bay Area counties. There have been several areas that we have focused on this past year including:

- Utilizing our PMS as a management tool. Previously the PMS was used only as a reporting mechanism, and as such, contained data inaccuracies caused by the absence of work history coupled with lack of current inspection data. The work history is now current and we have hired an independent consultant to provide road inspection services. Approximately one-third of our road system (1387 total miles) will be inspected each year.
- Creation of a Pavement Preservation Coordinator position. This position was created to coordinate our new program. The Coordinator (Steve Urbanek) has utilized the PMS reports in combination with road maintenance personnel to prepare our first annual pavement preservation plan for FY 08/09.

### How do you expect to improve the condition of your network using pavement preservation techniques?

Existing revenue sources are woefully inadequate to address Sonoma County's road pavement needs. Our plan to address our needs is three-fold: 1) maximizing available dollars for pavement preservation by cost reductions and efficiency improvements in other departmental operations, 2) working with our elected officials to focus pavement preservation dollars on a prioritized road network, and 3) identifying financial options for addressing the roads not prioritized.

For cost-effectiveness we will be utilizing a variety of road treatments this next fiscal year on higher volume roads that are in good condition.

### What are the most common techniques used in Sonoma County for pavement preservation?

We have a lot of experience with the construction of scrub/chip seals, slurry seals, thin overlays and the contracting of conventional overlays.

### What are the biggest challenges you are facing in terms of preserving your infrastructure?

By far the biggest challenge we face is exponential increases in material costs (asphalt, oils, etc.), fuel costs and labor costs with revenues that are either flat or decreasing with time. From 2003 to 2006, asphalt costs in Sonoma County increased by over 130%, our fuel costs for road operations increased by over 70%, our road maintenance labor costs increased by 14% with 5% fewer employees, yet our allocated gas tax revenues slightly decreased despite increases in vehicle-miles traveled within the county.

Our political challenge is not having to convince elected officials of the merits of preventive maintenance techniques or pavement preservation strategies, but to convince state and federal elected officials to develop a sustainable and stable revenue source to address our road infrastructure needs. Gas taxes are not indexed and are no longer sustainable as we further develop alternative fuel technologies. The significant increase in gas prices between 2003 and 2006 had no effect on miles driven in Sonoma County. Prices have jumped by more than a nickel overnight, yet State and Federal elected officials refuse to discuss gas tax increases or indexing. In fact just the opposite, federal elected officials are suggesting suspensions of the federal gas tax this summer and the State of California has suspended allocations of our State gas tax revenues for five months beginning in April.

Without adequate roadside drainage control, treatments designed to extend the life of the pavements fall far short of expectations, therefore, a significant operational and budget challenge is the necessary cleaning and re-establishment/repair of roadside ditches and culverts prior to pavement preservation activities. Additionally, there is so much vegetation and heavy brush encroachment in our county road rights-of-way that require significant efforts to remove the brush first in order to establish drainage control.

### How does your pavement management system help with managing your pavements?

Sonoma County uses MTC Streetsaver as our Pavement Management System. As mentioned earlier, this year we utilized the reports to identify system needs concentrating on higher volume roads in good condition. We field reviewed the report recommendations and developed a plan implementing strategies for Board approval in June.

### What sort of innovative techniques are you using in pavement preservation or rehabilitation?

We will be continuing to use some rubberized asphalt next year as well as experimenting with

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asphalt rubber chip seals. We will continue to use polymer modified rejuvenating emulsions for our scrub/chip seals and rejuvenating seals.

We are also following Caltrans work with warm mix asphalt as it is an interest of ours.

### **How can we get local agencies more involved in the Pavement Preservation Task Group (PPTG)?**

I think that the annual Pavement Preservation Conference is an excellent vehicle to introduce local agencies to the PPTG and to engage them in PPTG activities. I believe that the County Engineers website as well as the California League of Cities website should be considered for posting of conference dates as well as hot links to CP2 Center and PPTG. Additionally, you may want to continue attending the CEAC/League Conferences for promotion of your efforts.

### **What can the Center do to help you in your efforts?**

I am very interested in experimenting with new technologies. We have many roads in isolated locations where I would like to set-up some test strips to compare performances of different treatments. The problem, of course, is that we lack the funds for this kind of research. Perhaps the CP2 Center may have access to such monies. Another concept that I am interested in is the application of interlayers to build a quasi-structural section on top of existing pavement which typically would require recycling or reconstruction. In Santa Barbara County we used interlayers (portion of a recycle or reconstruction cost) on pavements with PCIs as low as 15 with good results after five years.



An inviting country road in Sonoma County. Heavy tourist traffic presents challenges to preservation efforts throughout the county.

Photo: Sonoma Co. Dept. of Public Works.



## **PCCAS 2008 Conference**

**By Robert Humer, The Asphalt Institute**

The West Coast User-Producer Group, officially called the Pacific Coast Conference on Asphalt Specifications (PCCAS), was first formed in 1956. It is the oldest of the national User-Producer Groups. From day one its mission has been to strive for uniform asphalt specifications throughout the Pacific States Region.



Dennis Jackson was a guest speaker at the PCCAS 2008 conference.

This group has a long line of accomplishments, of which the Rolling Thin Film Oven (RTFO) test, the AR grading system, evaluation of the PG criteria for controlling fatigue, the PBA grading system for polymer modified asphalts, and assisting with the implementation of the PG grading system in the Pacific Coast Region, just to name a few.

In its most recent conference on May 20-21, 2008, in Portland, Ore., reports were presented by the Binder and Mixture Committee, the Emulsion Committee, and the Recycling Committee. Items of interest with regards to pavement preservation were:

- The approval for optional use of a specification for two grades of tire rubber modified asphalt (terminal blends): PG 64-28TR and PG 76-22TR. These are high quality binders

using a minimum of 10% tire rubber, which meet specification requirements equal to the same PG grades for polymer modified asphalts. These PG-TR binders are applicable to dense graded mixes and surface treatments, such as chip seals and slurry seals.

- The Emulsion Committee studied the possibility of replacing the penetration testing of residue with DSR testing, found no correlation, and recommends to stay with penetration testing. AEMA did a study on methods for recovering the emulsion residue and found many that work. The CRS-2P spec stays the same with a minimum elastic recovery (ER) of 40 using the ODOT method. This committee will continue to study the adhesion and cohesion properties of emulsion residues, and the performance of polymer modified asphalt emulsions.
- Guest speaker Dennis Jackson presented the Pavement Preservation Road Map. Applying "the right treatment at the right time" is key to this concept.
- The Pavement Preservation Journal and the booklet "At the Crossroads: Preserving our Highway Investment" were presented as excellent educational tools.

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- In addition, a report was given of the National Expert Task Group (ETG) on pavement preservation, which was established some 20 years ago. More information can be obtained by logging onto [www.pavementpreservation.org](http://www.pavementpreservation.org).
- The Recycling Committee presented two guidelines for Cold-Mix Recycling of Bituminous Pavements. The first is a guide for the Laboratory Mix Design procedures and the second are guidelines for construction using Cold-in-place-recycling (CIPR) & Cold-Mix Recycling - Central Plant. It was noted that in any case the remaining base must be strong enough to support the weight of the recycling train. June 3-5, 2008, will see the First National Conference on CIPR, in Salt Lake City, UT.
- Discussions regarding recycling ensued on the need to adjust the binder grade or use rejuvenators, when a new mix design would be required, and when the reclaimed asphalt pavement (RAP) should be fractionated.

Other items presented in the PCCAS Conference were:

- The Binder Committee reported on the final Round Robin Report on DSR and BBR testing. Twenty-one labs tested 23 binders, producing 20,286 data points. Single operator and multi-lab precisions were established. Conclusions reached were that the RTFO/PAV needs improved precision; the phase angle does not define consistently that a binder is modified; and the PAV variability has less to do with the location of the pans in the PAV than the amount of binder in the pan.
- Updates on progress in the national Binder ETG were: the Multiple Stress Creep Recovery (MSCR) test is meant to replace all "plus specs" for determining that a binder has been modified. In preliminary studies, poly-phosphoric acid (PPA) treated binders are more susceptible to moisture, while polymer modified asphalts have the best moisture resistance.
- The Asphalt Institute presented an update on its National Binder Technician Certification program. The goal is to provide a consistent nationwide means of ensuring that asphalt binder technicians are knowledgeable and fully qualified to produce valid specification compliance and quality assurance data. The program is based on what was started by the New England Technician Training and Certification Program (NETTCP). A new training manual (MS-25) was developed with a focus

on many details of the AASHTO M-320 test procedures.

- On the second day, guest speaker Matt Corrigan (FHWA) presented a thorough overview of Warm Mix Asphalt (WMA) technologies, their history, and recent experiences. WMA technologies lower the binder viscosity, which allows production and construction at lower temperatures while achieving better aggregate coating. Where Hot-Mix is produced at 275° to 325° F, WMA is typically in the 250° to 275° F range. Benefits are energy savings, less emissions, less binder aging extended paving season, ease of compaction, and the possibility to increase the percent of RAP recycling without the mix getting too stiff. WMA technologies can be classified in three main groups: mix additives (such as Advera, Sasobit, and Evotherm); water injection (such as Gencor, Astec, and Stansteel); and material processing (such as WAM foam, and low energy asphalt). All together there are at least 13 different technologies. Moisture sensitivity is a concern that is being studied. Some 23 states have already tried WMA projects. Pennsylvania and Texas are furthest in WAM implementation. The WMA Technical Working Group started in 2005. Napa publication QIP 125 gives information on WMA Best Practices. The International WMA Conference will be held November 11-13, 2008 in Nashville, TN. More information can be obtained by logging onto [www.warmmixasphalt.com](http://www.warmmixasphalt.com)

*The dynamic modulus test is easy to run and does a good job of distinguishing one mix from another.*  
Photo: Asphalt Institute.



*Warm mix asphalt is unloaded at a job site.*  
Photo: Graniterock.

The next PCCAS Conference is tentatively planned for 2010, with committee meetings occurring approximately every four months.

The PCCAS provides an effective and legally acceptable framework for agencies and asphalt suppliers to discuss specifications. It is an excellent source of information on what's happening regionally and nationally. The PCCAS website is [www.pccas.org](http://www.pccas.org).



Kirsten Stahl

## Portland cement concrete: pavement preservation in the big city

By Kirsten Stahl, Caltrans PPTG Co-chair on  
concrete pavement preservation

This is a tale of the good, the bad and the ugly... Portland cement concrete (PCC) pavement that is. What does it take to keep freeway pavements in Los Angeles in excellent condition? Ah, therein lies a tale in the big city...

Preserving PCC pavement is, in many ways, like taking care of your teeth – albeit very big teeth! Keeping debris out of the joints, spall repairs, dowel bar retrofits, slab replacements, grinding and polyester concrete overlays, all have their time and place. The key, as in all other preservation treatments, is to prevent and treat problems before they become big-ticket items.

### The good, the bad, and the ugly

Our maintenance crews inherit any problems overlooked during design, or which go awry during construction. Good pavement designs and mixes, good aggregate, good treated bases, good load transfer, good ride index and good climate all contribute to the longest lasting PCC pavements. The bad are bad or non-existing bases, bad sub-grades, bad joint construction, bad shoulders, bad pavement drainage and any features, which are allowed to go bad due to neglect. In a busy urban environment the ugliest problems are often those most out of our immediate control: traffic congestion; narrow construction and maintenance windows to perform the appropriate work; limited funding; and certainly not least, the urgency for a quick fix, however short lived.

Most of us know that preservation treatments generally can't correct the bad and the ugly; what they can do is keep the good items performing well. Enough about generalities and analogies; let's get specific!

### Joint preservation

Jointed plain concrete pavements (JPCP), most commonly used in California, feature the weakened plane joint (WPJ), which is a saw cut, spaced at regular intervals in newly constructed concrete. The WPJ forms in the saw cut, and uses aggregate interlock to provide load transfer from one pavement slab to the next. As the slabs expand and contract in response to daily and seasonal temperature fluctuations, environmental debris, such as dust, rocks, dirt, metallic objects and other incompressible items, and water can enter the joints. This repetitive process causes several failure methods – spalling, loss of load transfer, base erosion, step faulting, and in extreme cases, slab blow-ups, to name a few.

Joint seals that keep out the debris and water are a simple way to prevent these potentially serious problems. Compression seals seem to perform the

best and last the longest. Liquid seals, which have not performed as reliably, are still viable options, and usually better than no joint seal at all.

### Joint repairs and restoration

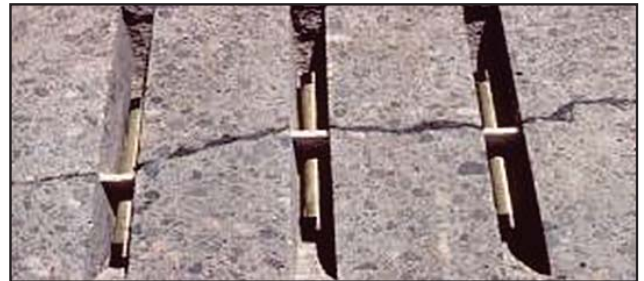
What – you waited too long to seal your joints, and now you have spalls and step faulting? Oh no! What should you do?

Spall repairs require a partial depth removal of the damaged joint, placing joint filler, applying a bonding-agent to the clean dry and sound surface of the concrete, and placing a patch. The longest lasting patches use methacrylate as the bonding-agent, and polyester concrete as the patch material. Other patches, in a side-by-side nine-year 1995 study of I-5 in the City of Commerce, did not perform well. Only the polyester concrete patches are still in service.

Step faulting, that thump, thump, thump, drivers feel in a JPCP, when one side of the WPJ is higher on the departure side of the slab, can be temporarily corrected by grinding, although this does nothing to restore load transfer in the WPJ. Step faulting is the primary clue that you have loss of load transfer at your joints. Currently the only preservation strategy to prevent that thump, thump, thump from returning too soon, is to dowel bar retrofit. Step faulting may also indicate a more severe problem - pumping and base erosion under your slab!

A dowel bar retrofit, in combination with surface grinding, restores an excellent ride for the driver. This strategy has the added benefits of additional years of life to the JPCP due to reduced repetitive curling of the slab and elimination of the impact loading when vehicles "drop off" of the departure slab. Surface grinding also restores the surface friction of the pavement, making the pavement

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Above, dowel bar retrofit of fatigue crack, and below, the completed retrofit.





surface safer in wet weather. What is a “dowel bar retrofit”? At each WPJ, up to 11 uniform slots are cut into the concrete, a properly aligned, smooth pavement dowel is inserted, and slots are backfilled with a non-shrink well-bonded grout. Depending on traffic loading, there are three or four slots per wheel path.

### Slab repairs

What? You still did not seal your joints, repair your spalls, restore your load transfer or correct your step faulting? Most likely this would result in impact loading of your slab, pumping of the slabs and very likely base erosion, all of which lead to slab failure – or in technical terms, third-stage slab



Third-stage cracking and pumping.

cracking.

Slab repair consists of removing the damaged pavement slabs by a non-impact method to prevent damage to the base and surrounding slabs, and replacing the old concrete with “rapid strength” concrete (RSC), or a pre-cast panel. Slab replacement can be costly, labor intensive, time consuming, and usually relies on specialty cements or admixtures to be able to reopen the JPCP in time for the morning commuter. However, at a typical replacement cost of \$2500 to \$3500 per slab, it is still the most cost effective treatment to keep the JPCP in a serviceable condition.

In Caltrans Los Angeles District 7, slab replacements with RSC and its precursor, fast-setting hydraulic cement concrete (FSHCC), have been used on a competitive-bid contract basis as early as 1997. CTS cement, one of the specialty cements, was used as early as 1994 for repairs of I-10 following the Northridge earthquake.

- After more than 11 years of experience in Los Angeles, contractors are achieving 400 psi (modulus of rupture) opening strengths in as few as 90 minutes. Combined with the non-impact method of slab removal, a maximum number of slabs can be replaced and returned

to service within very minimal construction windows.

- The flexibility of on-site batching, ready-mix delivery, volumetric mixers, or charging mixers from a silo or super-sacks, allows RSC slab replacements to occur any time of day or night, nearly anywhere in the State, including the most remote locations, and in extreme temperature conditions. RSC has been successfully placed in temperatures below 40°F and above 100°F, placed by hand, slip form pavers, and paving screeds alike.

Your imagination is the only limit.

### Other preservation activities and caveats

What about partial depth cracks, volunteer cracks, fatigue cracks, wide cracks, grade corrections, sub-sealing and slab stabilization?

- Partial depth cracks that are a defect of poor curing during construction have been successfully filled with high molecular weight methacrylate resin. This prevents spalling of these often numerous random cracks.
- Volunteer cracks are often a defect of late saw-cutting during construction. These cracks should be treated the same as a WPJ, and filled with a liquid joint sealant, as discussed earlier.
- Wide cracks that cannot be adequately sealed with a typical joint sealant, can often be repaired by placing a longitudinal isolation joint (LIJ) in Caltrans Standard Plans, and filling the remainder of the cracks with polyester concrete.
- Fatigue cracks that occur near the center of the slab as result from repetitive bending or overloading can be dowel bar retrofitted as discussed previously, and sealed with a liquid joint sealant.
- Grade corrections in JPCP are best achieved with a polyester concrete overlay. Polyester concrete is highly durable, chemical and abrasion resistant. When used for this purpose, on PCC or other hydraulic cement pavements, a methacrylate bonding-agent is required, and WPJ and most other joints are required to be restored to prevent delaminating of the overlay.
- Sub-sealing of un-reinforced pavement slabs can be a tricky business and can induce unwanted tensile stresses, which often accelerates cracking and can cause severe failures. Sub-seals must fully fill any gaps under the slab and not create pillows or unsupported voids. Sub-seals have frequently, although unintentionally, clogged, displaced, or collapsed adjacent drainage or other structures. Excessive volumes of exothermic sub-seals have started smoldering fires. The best advice, based on the L.A. experience, is

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to use an inert, cement-fly ash based, slow-setting, flowable grout, and proceed with caution.

- It would be great to have a reliable material that behaves predictably to fill in areas where there has been base erosion to fill in known voids under JPCP, such as at corners under the WPJ. So far, this author has not encountered that "ideal" material.
- Slab stabilization is often a fancy term for sub-sealing. The least risky, albeit more pricey, method of slab stabilization is to remove the unstable slab, repair the base, place a bond breaker, and replace the concrete with RSC or a pre-cast panel. In one slab-stabilization job gone bad, using a soft-foam sub-seal, the unstable slab flipped-up and severely injured a motorist. As in sub-sealing above, short-cuts to stabilizing slabs should be approached with caution.

### Treat the cause

Frequently unstable slabs are caused by an excess of water, which has caused pumping of water under the slab, probably eroded the untreated or poorly cemented base, or has drawn excessive fines from the untreated base in the shoulder or median.



A more extreme form of JPCP preservation is to improve the pavement drainage, to get rid of the excessive water, and to eliminate sources of untreated fines from entering the JPCP section. If this were not enough, the selected strategy needs to prevent further erosion of the base. The old-fashioned, minimal, 3" thick, AC shoulder over aggregate base is a classic contributor to pumping fines in the JPCP structural section.

Horizontal drainage galleries, terminal cross drains or drainage trenches, which use a combination of slotted pipes, geo-synthetic fabrics, and permeable backfill, to remove the excess water can be used to significantly reduce excessive water in the structural section. A section of I-10 in Pomona, an L.A. suburb, suffered for many decades, before this alternative was successfully employed.

Replacing the old under-designed, unsupportive shoulders and medians with a new tied or doweled JPCP shoulder can extend the life of the JPCP by reducing "cantilever" bending in the adjacent lane, and eliminate contribution of fines from the adjacent untreated base.

Now you know most of what there is to know about keeping JPCP looking good and performing up to its expectations.. Preservation and early intervention is the key to success, for everyone involved.



### Upcoming pavement preservation events

California Pavement Preservation Task Group (PPTG) all members meeting, June 17, 2008, Lodi, Calif., [www.cp2info.org/taskgroup](http://www.cp2info.org/taskgroup).

7th International Conference on Managing Pavements and other Roadway Assets, June 23-28, 2008, Calgary, Alberta, Canada, [www.icmpa2008.com](http://www.icmpa2008.com).

2008 AASHTO Maintenance meeting, Monterey, Calif., July 13-18, 2008, <http://www.dot.ca.gov/hq/maint/AASHTO/index.htm>.

2008 WASHTO meeting, Portland, Ore., July 20-23, 2008, [www.washto2008.org](http://www.washto2008.org).  
<http://www.concretepavements.org/9thiccp/>.

International Conference on Concrete Pavements, August 17-21, 2008, San Francisco, Calif., [www.concretepavements.org](http://www.concretepavements.org)

APWA Show, August 17-20, 2008, New Orleans, La., [www.apwa.net](http://www.apwa.net).

ISAET 2008, International Symposium on Asphalt Emulsion Technology, Crystal City, Va., September 24-26, 2008, [www.aema.org](http://www.aema.org).

ARRA Semi Annual Meeting, Atlanta, Ga., October 13-15, 2008, [www.arra.org](http://www.arra.org).

AEMA Asphalt Emulsion Workshops, Indianapolis, Ind., November 11-12, 2008, (users) and 13-14, 2008 (producers), [www.aema.org](http://www.aema.org).

California Pavement Preservation Task Group (PPTG) all members meeting, December 2, 2008, Los Angeles County, Calif., [www.cp2info.org/taskgroup](http://www.cp2info.org/taskgroup).

California Chip Seal Association (CCSA), Ontario, Calif., January 21-22, 2009, <http://www.chipseal.org>.

AEMA-ARRA-ISSA Annual Meeting, Feb 18-21, 2009, Palm Springs, Calif., [www.slurry.org](http://www.slurry.org).

California Pavement Preservation Conference, April, 2009, Northern California, [www.cp2info.org/conference](http://www.cp2info.org/conference).

First International Pavement Preservation Conference, Southern California, April, 2010.



# California statewide local streets and roads needs assessment study

by Margot Yapp, P.E., PPTG co-chair, Pavement Management

In November, 2006, voters in California passed Proposition 1B, which authorized the state to sell \$20 billion of general obligation bonds to fund transportation projects related to congestion, highways, public transportation, good movement, air quality, safety and security.

Of the \$20 billion, only 10% went to improving local street and roads (i.e., those maintained by cities and counties, this despite the fact that city and county streets and roads comprise more than 80% of the total mileage in the state).

Agency	Center-line miles	% of total	Lane-miles	% of total
Cities & Counties	137,832	82	295,277	79
State highways	15,243	9	50,644	14
Other/Federal	14,156	8	28,312	8

Table 1. Breakdown of pavement network in California.

2006 California Public Road Data (from the Highway Performance Monitoring System), Caltrans, July, 2007.

## Why didn't cities and counties get more money?

A key reason why cities and counties did not get a larger piece of the pie is that there is no comprehensive statewide needs assessment for local streets and roads. We hear a common refrain from the cities and counties, "We need more money!" but the fact is, no one really knows exactly how much is needed statewide.

Numerous agencies at both the local and regional levels have varying levels of information, but no single agency has compiled and synthesized the data for the entire state.



Therefore, a comprehensive, statewide needs assessment of local streets and roads was required to facilitate informed and defensible decision-making by elected and public agency officials.

## Study sponsors

In 2007, the California State Association of Counties (CSAC), the League of California Cities (League), and the County Engineers Association of California (CEAC) in partnership with the Regional Transportation Planning Agencies (RTPA), the California Councils of Government (CalCOG), and the California Rural Counties Task Force (RCTF) took a leadership role in funding a needs assessment study of city streets and county roads in California that includes

both pavement and non-pavement transportation needs.

Mr. Pat DeChellis, Deputy Director for the Department of Public Works from Los Angeles County is the Project Manager for CEAC.

## Study objectives

The basic questions are as follows:

1. What are the conditions of local streets and

roads? Non-pavement assets?

2. How much will it cost to bring them up to a good condition?
3. How much will it cost to maintain them in good condition over the next 25 years?
4. How much revenue is projected to be available over the same 25 years?
5. Is there a funding shortfall, and if so, what is it?

The goal of 100% participation is to ensure that the results will be comprehensive and complete. It is also anticipated that future updates will be performed periodically to maintain this information. This study will therefore also develop a standard methodology to facilitate future updates.

## Key challenges

There are 478 incorporated cities and 58 counties in California, for a total of 536 agencies. Most have some form of pavement management system in place, which allows some estimate of the needs assessment. A few have data on other transportation or non-pavement assets, such as storm drains, sidewalks, curbs and gutters, traffic signals, street lights etc. Data is readily available on approximately 302 agencies, leaving 234 with unknown data.

There are several key challenges in the needs assessment:

1. collecting data from the 234 agencies in the "unknown" category,
2. comparing pavement condition data, e.g., qualitative vs. quantitative,
3. availability of data on non-pavements,
4. communicating the results.

## Data collection

Introductory letters and questionnaires were sent to the cities, counties, Metropolitan Planning Organizations (MPOs) and Regional Transportation Planning Agencies (RTPA). Shortly thereafter, almost 2000 follow-up phone calls were made to confirm receipt of the letters, to answer questions and to encourage participation.

Although the data collection process is still underway, the overall response has been overwhelmingly positive.

## Comparing "apples" and "oranges"

Once the initial data collection is complete, the challenge is to synthesize the information received. It is anticipated that there will be significant variation in pavement condition surveys and protocols, qualitative condition descriptions (a "good" pavement may mean different things to different agencies), threshold or trigger values for maintenance and rehabilitation, types and cost of treatments,

Continued on next page

prediction models (particularly as a function of climate) and methodologies to assess “needs.” A key goal of the data collection effort is to develop a robust and reliable methodology that will allow comparisons statewide.

### Non-pavements data

More challenging will be non-pavement data collection. Defined as those assets that are related to pavements and their maintenance, e.g. storm drains, sidewalks, curbs and gutters, traffic signals, street lights, the data are limited at best, non-existent at worst.

However, NCE developed a methodology using regression analyses to predict non-pavement needs for a Metropolitan Transportation Commission (MTC) study. The results of the MTC study provide an excellent starting point for the statewide assessment.

### Communicating the results

Although the results may find their way into a comprehensive, well-documented final report, it is only through an effective marketing strategy that the “product” will be “sold” to public officials — Governor, Legislators, California Transportation Com-

missioners, City Council Members and Boards of Supervisors. Audience-specific presentations will be critical to “spread the gospel.” Success will be measured by advocacy for more funding.

### What’s next?

Over the next 10 months, NCE will continue to collect and analyze the data and develop methodologies to facilitate a meaningful statewide comparison of “needs.” The target completion date is April 2009. If your agency is interested in participating in this study, go to [www.SaveCaliforniaStreets.org](http://www.SaveCaliforniaStreets.org) to get more information or contact:

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## Surface recycling in California

By Donald M. Matthews, Industry Co-chairman, Recycling Subtask Group PPTG



Picture 1. Surface recycling operations near Williams, Calif.

### Definition of recycling

Surface recycling is the reuse of Reclaimed Asphalt Pavement (RAP) into another asphalt concrete pavement. That is, what it was is what it will be. Surface recycling can be accomplished in-place by using trains of equipment that mill/scarify at the front end of the train and pave back the new asphalt concrete at the back end of the train via the Cold In-place Recycling (CIR) or Hot In-place Recy-

cling (HIR) methods. Alternatively it can be accomplished via the central plant method where the RAP is milled, trucked to a central location, recycled and then trucked back to the same or alternative location. Recycling is by the Hot Recycling (HR) method at a conventional hot asphalt concrete plant where small percentages (typically 15% or less in California on average) are used in the final asphalt concrete or in the Cold Central Plant Recycling (CCPR) method where up to 98% is utilized.

*Continued on next page*

Picture 2. hot in-place transformation equipment to be used in District 2 (Redding, Calif.) and District 8 (Desert Hot Springs, Calif.)





Surface recycling is often confused with Full Depth Reclamation (FDR), which is an in-place technique that recycles RAP by mixing the existing asphalt pavement with the underlying un-bound layers such as an aggregate base or the native soils. This mixture becomes a new base product that can be stabilized with cement, lime, asphalt emulsion or asphalt-foam to form a stronger stabilized base. FDR is becoming somewhat commonplace in California with Caltrans having completed many asphalt-foam stabilized base projects. Many local agencies routinely use the whole range of stabilizers in a variety of applications to rehabilitate roadways with inadequate structural sections. Surface recycling does not, in and of itself, add structure to the pavement – it restores the structural section that has deteriorated over time and under traffic.

Picture 3. Cold central plant recycling on Route 79 near Warm Springs, Calif.



### Surface recycling in California

Surface in-place recycling in California is not as commonplace. When accessing the status of surface recycling in California, a good analogy is that of the glass being half empty or half full. At the State level the optimist will point to the fact that the Caltrans' Cold In-place Recycling (CIR) Non Standard Specification using an emulsified recycling agent was completed in 2005 and then used successfully in September, 2007 in District 3 on State Route 16 near Williams (Picture No. 1). This project was



Picture 4. In-place recycle train on I-80 near Auburn, Calif.

three and half-miles long, two-lanes and saved over \$300,000 in comparison to the alternative proposed section. Another project in District 8 is scheduled to be constructed on Route 62 near the Arizona border this summer with at least four more projects throughout the State scheduled for construction in the next two years. An in-place recycling technology using cold foam as the binding agent was completed on Interstate 80 in 2006 and won the first ever Green California Leadership Award. In addition, an innovative HIR project using a process called Hot In-place Transformation is scheduled to be completed in both District 2 and District 8 this summer (Picture No. 2). However the pessimist will point to the fact that in the past 15 years Caltrans has in-place recycled a total of 60 lane miles versus our neighbor

to the east, Nevada, that in the same time frame has in-place recycled over 1,000 lane miles ranging from rural routes to Interstate 80.

On the local level the glass is a little more full with cities like Lemon Grove, San Diego, Modesto, Brawley, El Centro, Blythe, Riverside, Cathedral City, Chino, Santa Ana, Yucaipa, Fresno and the counties of San Bernardino, Sacramento, Riverside and Ventura having completed, or will complete, by the end of the year, in-place recycling projects. Still the pessimist will point out that the percentage of roadways that could be in-placed recycled compared to the actual roadways that are in-place recycled remains a very small percentage.

Surface recycling by the central plant method looks to fill the glass somewhat by virtue of Caltrans headquarters now allowing up to 15% RAP incorporated into all non-rubber hot mix asphalt concrete at the contractor's discretion with a proper mix design. However, the pessimist will point to certain projects within Caltrans, by virtue of the special provisions overriding this intent and prohibiting the use of RAP in non-rubber asphalt concrete. There are even some local agencies that prohibit RAP entirely in any hot mix. This causes the percentage of RAP used in hot mix asphalt concrete across California to be substantially below an average of 15%. Eternally positive, the optimist will point out that the City of Los Angeles successfully incorporated a program where between 50% to as high as 97% RAP has been used in hot mix produced for the City for many years.

Cold Central Plant Recycling is on the rise with San Bernardino County completing two projects, including a high elevation housing tract subject to winter snows. Caltrans District 11 completed a successful CCPR project on Route 79 in spring 2006 and is developing budgeting for another (Picture No. 3). CCPR asphalt concrete is being evaluated by many local agencies as an alternative pavement in a variety of applications. So although the glass is beginning to look fuller from an overall rising trend in the statewide percentage of RAP recycled, perhaps the glass is just smaller compared to other states that use higher percentages of RAP routinely.

### Summary

In summary, whether the glass is half full or half empty, all can likely agree that California's natural resources are dwindling and on some scale recycling needs to be incorporated (Picture No. 4). For perspective, the Caltrans Interstate 80 recycle project alone is conservatively estimated to have saved 30,000 gallons of fuel, 230,000 construction truck miles, 112,000 tons of aggregate base and more than 7,900 pounds of nitrogen oxide emissions. And that was just one of tens of thousands of projects conducted that year. So whether you think the glass is half empty or half full, let's just make sure it never runs completely dry.

## FHWA Pavement Preservation ETG meets in Newport Beach, California

By Steve Mueller, FHWA



Steve Mueller

The FHWA Pavement Preservation Expert Task Group (PPETG) met in Newport Beach, Calif., on April 7-8, 2008, to discuss and coordinate a number of national issues and to share information. The PPETG is co-chaired by Mr. Dennis Jackson, a private consultant in the industry who was formerly with WSDOT, and Mr. Jim Sorenson, the Construction and System Preservation Team Leader for the FHWA Office of Asset Management in Washington, D.C. Joe Gregory acted in place of Jim Sorenson as FHWA co-chair. The meeting immediately preceded the 2008 California Pavement Preservation Conference.

The PPETG has five subcommittees. At the meeting each of the subcommittees reviewed their activities and updated their short- and long-term goals as noted below:

- **Pavement preservation acceptance and implementation** - topics discussed included the FHWA Focus Area Leadership and Coordination (FALCON) Teams which have been formed to help guide FHWA's Pavements and Materials Program; the Transportation System Preservation Program update; and the Caltrans Innovation Program update. Dr. Shakir Shatnawi of Caltrans made the latter presentation.
- **Research programs support** - a number of research projects were discussed including those on chip seals over fabrics, the SHRP 2 R-26 project on pavement preservation for high volume roadways, the role of pavement preservation in the MEPDG, environmental effects of pavement preservation, and the crack sealant pooled fund study. In addition, the FHWA Transportation System Preservation Roadmap, which includes research problem statements for both pavement and bridge preservation, was discussed at the meeting.



PPETG Co-chair  
Dennis Jackson

- **Pavement preservation centers and regional and state organizations support** - reports were given on the Pavement Preservation Partnerships (Western, Rocky Mountain, Midwestern, Northeastern, and Southeastern) which are in various stages of development in different regions of the country; the National Center for Pavement Preservation at Michigan State University, and the California Pavement Preservation Center at Chico State. Dr. Gary Hicks, Technical Director of the California Center, delivered the latter report.
- **Pavement preservation training and certification** - reports were delivered on the state of various certification efforts that are being undertaken around the nation, and the status of the National Highway Institute training classes.
- **Portland cement concrete pavement preservation** - A new subcommittee was formed to specifically address this topic. The subcommittee planned its upcoming activities and performed its initial goal-setting.

A new Asphalt Emulsion Task Group comprised of emulsion experts from around the nation held a concurrent meeting with the PPETG, and they provided a brief report on their progress. The group is examining the needs for improved specifications and training in asphalt emulsions within state DOTs.

Upcoming events and conferences that were discussed by the PPETG included: the ARRA/FHWA In-Place Recycling Conference in Salt Lake City on June 3-5, 2008, and a proposed International Conference on Pavement Preservation to be held in April, 2010.

If you would like more information on the activities of the FHWA Pavement Preservation Expert Task Group, please visit: <http://www.pavementpreservation.org/expert/>, or contact Joe Gregory in the FHWA Office of Asset Management via e-mail: [Joseph.Gregory@dot.gov](mailto:Joseph.Gregory@dot.gov).



### First International Conference on Pavement Preservation

The First International Conference on Pavement Preservation will be held in April, 2010, in Southern California with the aim of bringing together researchers and experts working in the field to exchange ideas and discuss critical issues and concerns. The conference will be co-organized by Caltrans, FHWA, and the Foundation for Pavement Preservation.

The main theme of the conference will be pavement preservation and sustainability. The conference will address an array of issues relevant to the pavement preservation community. Authors will be invited to submit abstracts that will be reviewed by a technical committee based on quality and relevance. Authors of the selected abstracts will be invited to submit full papers to be included in the conference proceedings. If you are interested in the conference, please contact the conference chair, Shakir Shatnawi at [shakir\\_shatnawi@dot.ca.gov](mailto:shakir_shatnawi@dot.ca.gov).





## FHWA Expert Task Group discusses high percentage RAP use

By Brandon Milar, PPTG Education Co-chair

**T**he Recycled Asphalt Pavement Expert Task Group (RAP ETG) met in San Diego on March 5-6, 2008, to discuss the state of the practice and the use of 45+ % RAP in HMA. Caltrans hosted the event and was well represented at the meeting. Mary Stroup Gardiner of the California Pavement Preservation Center also participated in the meeting. Items discussed included the following:

**Survey of RAP usage:** A survey of all state DOT's was completed. DOT's shared their current usage, specification restrictions, and knowledge gap. A revised survey will be completed by year's end to verify information and collect additional information.

**RAP variability:** An analysis tool was presented that assists a contractor in determining risk based on variability of the RAP stockpile. The tool utilizes the standard deviation of the RAP, virgin aggregates,

equipment, and spec limits. The results include the maximum and limiting RAP percentages for the mix. This tool can be utilized during the mix design process before actual production.

**Ongoing research:** Research by Florida DOT, National Center for Asphalt Technology (NCAT), Asphalt Research Consortium, and NCHRP projects were presented and discussed. All of these include high percentage RAP evaluation in both lab and field projects.

The RAP ETG consists of representatives from public agencies (FHWA, CODOT, FLDOT), industry (Heritage Group, NAPA, Granite Construction), and research entities (NCAT, UNR). This group focuses on coordinating efforts to promote the use of RAP through education and the identification and sponsorship of research needs.



## Foundation for Pavement Preservation Update

By Jim Moulthrop and Gerry Eller



Jim Moulthrop,  
Fugro Consultants

**T**he Foundation for Pavement Preservation is a not-for-profit foundation formed nearly 15 years ago and supported by the Pavement Preservation Industry, represented by contractors, material suppliers, equipment manufacturers, consulting engineers, and academia.

The mission of the Foundation is to continually advocate pavement preservation principles and support public agencies at all levels to allow them to provide the highest level of service to their highway system customers through the use of a dynamic pavement preservation program.

The Foundation's goal is to provide leadership and public outreach for preservation activities. At the national level, we serve as an industry conduit for

technology improvements and information sharing with the Federal Highway Administration (FHWA), American Association for State Highway & Transportation Officials (AASHTO), National Association of County Engineers (NACE) and other public agencies. In addition, we assisted in the founding of, and continue to provide monetary support for, the National Center for Pavement Preservation at Michigan State



Gerry Eller, Director,  
Foundation  
for Pavement  
Preservation

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University (NCPPI). At the local and regional levels, the Foundation has been a key player in the establishment of regional Pavement Preservation Centers in Texas and California and the development of Pavement Preservation Regional Partnerships across the United States.

### Management

The Foundation is managed by an Executive Director (Gerry Eller) who reports directly to a volunteer Board of Directors representing the various constituents who provide monetary support to fund the various activities of the Foundation. Gerry retires at the end of May and a search will be made for a new director.

### Leadership

The Foundation and the FHWA recently teamed with ECS Consultants in the development of a Pavement Preservation Research Roadmap that highlights research needs in the pavement preservation arena including planning, asset management, construction, materials and maintenance. The Roadmap has been posted on the NCPPI web site, <http://www.tsp2.org/roadmap/index.php>.

An ongoing study supported by FHWA and administered by the Foundation is evaluating the efficacy of using spray applied seals in preserving pavement surfaces and, at the same time, studying the effects of these treatments on friction and texture properties of the surface upon which it is applied. Although a final report will not be printed, over 5,000 copies of a CD documenting the project have been distributed at various meetings since the Transportation Research Board 2008 annual meet-

ing. The contents of the CD can be accessed at the Foundation website, <http://www.pavementpreservation.org/fogseals/>.

### Public Outreach

The Foundation has been very instrumental in producing a quarterly publication entitled *Pavement Preservation Journal* that emphasizes the benefits of a preservation program and its attendant savings associated with an agency's budget. A recently released booklet entitled *At The Crossroads* analyzes the dichotomy of the state of the nation's pavement condition versus the funding necessary to bring the condition to an acceptable level and the challenges associated with this effort. Both of these publications can be accessed at the Foundation website noted below.

The Foundation has been adamant regarding the proposition that "keeping good roads in good condition" is a mantra that all agencies need to be adopting. Clearly TRIP and other proponents of safe, reliable transportation facilities for the motoring public have amplified these needs. In this effort, the Foundation has been very active in supporting the activities of the National Pavement Preservation Center and the regional centers that have emerged.

The Foundation for Pavement Preservation looks forward to a continuing and fruitful relationship with the California Pavement Preservation Center and the West Coast Pavement Preservation Partnership to provide the "right treatment to the right pavement at the right time." For more information about the Foundation, contact the web site at [www.pavementpreservation.org](http://www.pavementpreservation.org) or call 1-888-862-4587.



Slab repair will be one topic in the workshop to be presented at the concrete pavements conference. The photo above shows a typical RSC slab replacement.

## Workshop on concrete pavement preservation for the Ninth International Conference on Concrete Pavements

August 17-21, 2008, San Francisco, Calif.

By Shakir Shatnawi, Chief, Office of Pavement Preservation, Caltrans and Craig Hennings, Director, ACPA, Southwest Division

Caltrans and the California Pavement Preservation (CP2) Center have developed a

workshop for the International Conference on Concrete Pavements. The purpose of the workshop is to feature presentations on the importance of rigid pavement preservation, preservation treatments and case histories. Proposed speakers for the workshop, planned for Sunday, August 17, are as follows.

**Introduction To Pavement Preservation, Including Pavement Distress**, Mary Stroup-Gardiner, California Pavement Preservation Center  
**Overview Of Pavement Preservation Treatments For Concrete**, John Roberts, Executive Director, American Grinding & Grooving Assn.

**Case History Of Dowel Bar Retrofit In Washington State**, Linda Pierce, State Pavement Engineer, Washington Dept. of Transportation

**Case History Of Diamond Grinding In California**, Casey Holloway, Penhall, Co-Chair, California Pavement Preservation Task Group

**Case History On Slab Repair In Southern California**, Kirsten Stahl, Senior Materials Engineer, District 7, Caltrans

**Summary comments**, Craig Hennings and Shakir Shatnawi

You can find more information on the workshop and the conference at the following website: [www.concretepavements.org](http://www.concretepavements.org).





## Continuing education and university curricula for RAC and CE applications of waste tires

By Ding Cheng, CP2 Center

Annually, California generates about 40 million passenger car equivalent waste tires. After significant efforts from California Integrated Waste Management Board (CIWMB), other agencies, and industry, a large percentage of these waste tires are utilized for tire derived fuels, rubberized asphalt concrete (RAC), civil engineering applications, and other tire derived products (TDP). However, there are still a significant number of waste tires being dumped in landfills and illegal tire stockpiles that pose a potential fire threat and environmental issues.

In order to eliminate waste tires in landfills and to encourage the sustainability of utilizing waste tires, the California Pavement Preservation (CP2) Center, Chico, is working on a two-year, \$350,000 educational project for the California Integrated Waste Management Board. The objectives of the project are to develop university curricula for educating students on RAC and Civil Engineering (CE) applications of waste tires, and to develop workshops for continuing education of professionals on the uses of waste tire on RAC and CE applications.

During the Fall 2007 semester, teaching materials for five different university courses were developed, as shown on the table below. The photos on the right show students' informal presentations for two of these classes.

By the end of the spring 2008 semester, the teaching materials related to another five classes will be developed and delivered. The freshman level, Introduction to Civil Engineering Design, covers the general introduction of civil engineering applications of waste tires and RAC. The Soil Mechanics class

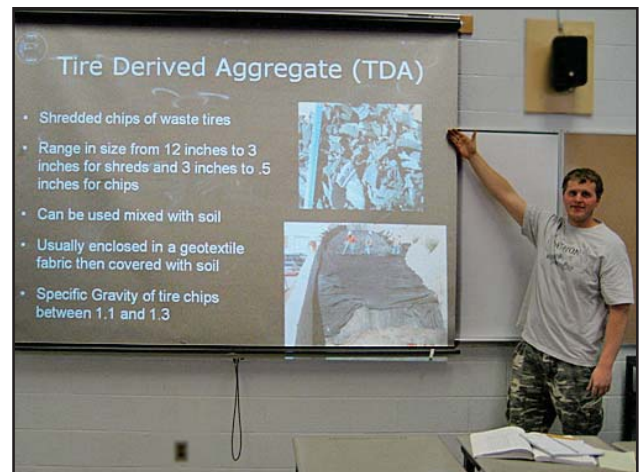
CE department class	Waste tire civil engineering application related lecture
Transportation Engineering	Design and Construction of RAC Products
Asphalt Paving Materials	RAC and Asphalt Rubber Spray Applications
Contracts, Specifications and Technical Reports	Caltrans Specifications for RAC-O and RAC-G Mixes
Foundation Engineering	Tire Derived Aggregates in Retaining Wall Backfill, Lightweight Fills and Embankments
Portland Cement Concrete	Waste Tires in Portland Cement Concrete

covers the use of TDA and a slope stability design laboratory with TDA. The Environmental Engineering class covers the environmental impacts and benefits of RAC and TDA applications. The Strength of Materials class covers the engineering properties of TDA. The Structural Lab class covers the shear strength parameters and direct shear tests of TDA.

A preliminary set of workshop training materials for continuing education of professionals has been developed. During the summer of 2008, the training materials for workshops of RAC and Civil Engineering applications of waste tires will be refined and mock workshops will be conducted. A training workshop is planned to be presented at the 40th annual training conference of Maintenance Superintendent Association (MSA) August 25-28 in Rohnert Park, California.



Chico State student Shane Winton presents his project on rubberized asphalt concrete.



Chico State student Cody Menefee presents his student project on tire derived aggregate.

In summary, the teaching materials related to RAC and CE applications of waste tires will be developed for about ten university classes from the freshmen to senior year. Later the materials will be disseminated to interested universities in California, including University of California System, California State Universities, and Community Colleges. An instructor workshop on class training materials will be conducted the summer of 2008. The workshops for continuing education on RAC and CE applications of waste tires will be given to professionals starting in the fall of 2008. For more information on the workshops, please contact Professor Ding Cheng at [dxcheng@csuchico.edu](mailto:dxcheng@csuchico.edu).

## MTAG training plans

By Larry Rouen, Caltrans Office of Pavement Preservation

**T**he Caltrans Division of Maintenance with assistance from the Pavement Preservation Task Group (PPTG), MACTEC and the California Pavement Preservation (CP2) Center, have revised the Maintenance Technical Advisory Guide (MTAG) with the addition of several new chapters, including rigid pavements treatments. The complete list of chapters is shown on the right.

Along with these new chapters, training modules were developed for each topic. was held in Lodi, Calif., on March 17-21, 2008, for Caltrans and local agency personnel. More than 85 people participated in the event, which was an intensive seminar that covered all chapters in sufficient detail to provide the participants with a working knowledge of all the pavement preservation techniques. Additional training is scheduled in Southern Califor-

### Flexible chapters

Introduction  
Materials  
Treatment selection  
Crack sealing  
Patching and edge repair  
Fog and rejuvenating seals  
Chip seals  
Slurry surfacings  
Thin maintenance overlays  
Bonded wearing surfaces  
Interlayers  
Surface recycling

### Rigid chapters

Introduction  
Surface characteristics  
Treatment selection  
Joint resealing  
Diamond grinding  
Dowel bar retrofit  
Partial depth repair  
Isolated slab replacement

nia, then an MTAG overview will be taken to each of the twelve district offices around the state.

If you are interested in receiving information on the MTAG or on future training classes, please contact please contact Larry Rouen via email:

[larry\\_rouen@dot.ca.gov](mailto:larry_rouen@dot.ca.gov).



## Pavement Preservation Certificate Program



**Who** will be interested in these classes? People involved with highway-related agencies or industries such as construction companies, material suppliers, equipment manufacturers, and consulting laboratories.

**Why** would I be interested in Pavement Preservation classes? If you need to interact with anyone in a highway agency or industry, good communication means a good understanding of the terms, design considerations, and reasoning behind preservation, maintenance or recycling options as well as economical and environmental impacts of decisions associated with these activities.

**What** topics will be covered? Four 3-credit classes will be offered. The first class, Pavement Preservation Overview, will provide the student with an understanding of the history and agency implementation of current preservation programs. The second class, Flexible Pavements, will include 1) flexible pavement design basics, 2) flexible pavement distress identification, quantification, and causes, and 3) preservation, rehabilitation, and recycling strategies. The third class will cover the same topics for rigid pavements. The fourth class will use the concepts and tools from the preceding classes to understand, develop, and implement pavement preservation and management programs. Each class will require a 10-12 page term paper to be studied and reviewed by the other students enrolled in the class. Other on-line assignments will also be required.

**When** will the classes be offered? The first two 3-unit classes, Pavement Preservation Overview and Flexible Pavements, will be offered during the fall semester, 2008. Classes begin August 25, 2008, and will run through December, 2008. Students enrolled in the Web based classes will be required to work each week on assigned topics so as to allow instruction and study to run concurrently. Students and the instructor, Dr. Mary Stroup-Gardiner, will communicate on the week's topic.

**Where?** On-line at California State University, Chico, California. Contact the California Pavement Preservation Center for instructions to enroll in early July, 2008.

**How** do I earn the certificate? Once you complete the four courses with satisfactory grades the certificate will be awarded through Regional and Continuing Education at CSU, Chico.





## Cp2 Center news

### Center Fact Sheets and Tech Briefs

The Center has developed tech briefs on the Pavement Preservation Task Group (PPTG) accomplishments for 2007 and plans for 2008. It is developing tech briefs on quiet pavements, warm mixes for pavement preservation, and the 2008 Pavement Preservation Conference. Fact sheets on surface recycling, fog seals, and innovation, as well as one on the Maintenance Technical Advisory Guide (MTAG) development and training, also have been completed in cooperation with the PPTG. Plans are to continue the development of these short documents. For copies of the completed documents, please go to the PPTG website [www.cp2info.org/taskgroup](http://www.cp2info.org/taskgroup). If there are other tech briefs or fact sheets you would like to see, please let us know by contacting our Technical Director at [rghicks@csuchico.edu](mailto:rghicks@csuchico.edu).

### Wanted:

#### CP2 Center is looking for questions or case histories

The CP2 Center is looking for questions related to pavement preservation that you would like to see addressed as an article in one of our next newsletters. Also, if you want to submit any questions or an article on a pavement preservation related issue for consideration in the September newsletter, it should be received by August 15, 2008. Please submit them to [tferrara@csuchico.edu](mailto:tferrara@csuchico.edu)

### CP2's on-line course nominated for award

The Center's first on-line course "Strategies for Selecting Pavement Preservation Techniques," offered in spring, 2008, by CP2, was nominated for an "Exemplary On-line Instruction" award recently (see story about the Certificate Program on page 16). This nomination places it in the top five on-line courses university-wide at CSU, Chico. The course was developed this past fall by Denny Gier, P.E., Pavement Preservation Engineer at CP2. CIVL 698 is currently being taught by Dr. Mary Stroup-Gardiner as part of the CP2's on-line certificate program. It is being evaluated by the Teaching and Learning Program's Evaluation Committee this summer. The Center for Excellence in Learning and Teaching (CELT) "Exemplary On-line Instruction" awards will be presented by Sandra Flake, Provost at their annual banquet in the fall.



### New positions to open soon

The Center will be advertising for a new Technical Director and a Senior Pavement Preservation Engineer to begin work in January 2009. The position announcements will be posted on the university website in the near future. For more information on these positions, please contact Dr. Ferrara at [tferrara@csuchico.edu](mailto:tferrara@csuchico.edu).

### Rotating CSU Engineer Program

The California Pavement Preservation (CP2) Center's Rotating Engineer Program can range from six weeks to as long as a one-year experience that will provide benefits to the national pavement preservation efforts, the California Department of Transportation (Caltrans), local agencies, and the candidate. This is a joint program in which the applicant's employer provides their standard salary and benefits while the CP2 Center provides office space, office support and hands-on training

for a wide range of pavement preservation experiences. Topics to be covered by each participant can be developed in conjunction with the employer, participant and CP2 Center. For example, one participant may want to gain laboratory experience in testing various surface treatment materials while another participant might want to assist in the development of a pavement preservation program for a small local agency.

The project topics can focus on pavement preservation subjects which include, but are not limited to, environmental assessments of preservation technologies, forecasting treatment life expectancy, development of non-standard specifications, technology transfer and training, and construction of innovative projects. The participant in turn, will gain expertise and an understanding of agency perspectives in these areas. In addition, the selected participant will have an opportunity to live and work in Northern California, which promises to enhance the incumbent's working and personal experience.



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