



CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

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CalAPA Conference Draws Big Crowd

By Roger Smith, CP2 Center



Figure 1. Steve Takigawa, P.E., Deputy Director of Maintenance and Operations, Caltrans was a featured speaker at the CalAPA Fall Conference

The big fall event for those in the world of asphalt is the 'Fall Asphalt Pavement Conference and Equipment Show' put on by the California Asphalt Pavement Association (CalAPA). On October 28 & 29, over 270 people made their way to the Double Tree Hotel in Sacramento for another very worthwhile event.

According to Russell Snyder, CalAPA Executive Director, "With so much changing in the world of asphalt pavements, it presents a challenge for industry and agency personnel to stay on top of things. The conferences are a very efficient way to get the latest information from noted experts to a wider audience in a relaxed setting."



Figure 2. Steve Healow of FHWA hears about a hot patch device from Freddie Benitez of Hemi Equipment

The line-up of respected speakers and timely topics, as well as the many interesting vendor exhibits, make this event a very popular one. Here's an overview of the highlights.

The attendees were welcomed by John Greenwood, CalAPA Board Chair, General Manager for California Commercial Asphalt, LLC.

Featured Speaker, Steve Takigawa, Caltrans Deputy Director of Maintenance & Operations

Caltrans SHOPP program increased by \$400M, but funding must be shared with non-pavement needs such as bridges and culvert updating. With transportation funding at the forefront of legislative discussions, Caltrans has identified a need for \$1.8B additional funding. With that funding, Caltrans is demonstrating efficiencies such as their Pavement management program, vehicle fleet, reduced-energy use freeway sign lighting,

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and smart controllers for landscape watering. A key Caltrans goal is accountability, and the MAP 21 federal funding will require performance measures for pavement work. A recent Caltrans survey of contractors and consultants as to Caltrans overall performance and effectiveness showed that there's lots of room for improvement. A third party will be used to help Caltrans address these concerns.

Superpave "Lite" for Local Agencies (Paul Curren, P.E., Consultant)

Prior to Caltrans' recent implementation of Superpave via a new Section 39 of their Standard Specifications, the old Section 39 included a Type B hot mix asphalt (HMA). This Type B HMA imposed less stringent criteria for Hveem stability, percent crushed aggregate faces, and other aggregate quality characteristics. The Type B mix was intended primarily for use on very low traffic roads or by cities and counties when utilizing the State specifications. With the implementation of Superpave, Caltrans has eliminated the Type B mix from the Standard Specifications, but the fact remains that many local agencies (cities and counties) routinely refer to Caltrans specifications. Accordingly, a task group was formed to create an HMA specification that integrates the Superpave concepts in a new "Type B" HMA specification that accommodates the needs of local agencies, by somewhat relaxing material quality requirements and the requirements for materials testing by both the contractor and the agency. Of course, agencies may still opt to use the standard Caltrans Section 39 (Superpave) specification for their more heavily trafficked roadways. The goal of the task group is a new Caltrans Standard Special Provision (SSP) for Hot Mix Asphalt for Low Volume roads (HMA-LV), designed especially for local agency use. A draft specification has been developed, but further efforts towards implementing it have been put on hold by Caltrans. Co-chairs for this effort are Tim Denlay (Knife River) and Kee Foo (Caltrans).

Increasing Crumb Rubber Modifier Use (Chuck Suszko, Caltrans)

In light of Caltrans falling short of its goals for using ground tires, known as crumb rubber modifier (CRM) in asphalt products, the Department is exploring other tools to help reach its goals. Historically, using asphalt rubber binder (20% CRM) in hot mix (RHMA),

and hot chips seals have been the workhorse approaches. Nevertheless other rubber products are being considered at including a more permissive modified binder spec (PG-M) wherein a minimum of 10% CRM must be used, possibly in addition to polymer modifier. Another proposal is to require 5% CRM in all HMA. Research on this approach is currently under study by the Pavement Research Center at U.C. Davis, funded by the CalRecycle Department.



Figure 3. CalAPA's Rita Leahy (left) moderates Caltrans Hot Topics Panel presenters: Sri Balasubramanian (center) and Chuck Suszko (right)

CRM Verification Process (Don Goss, Valero Refining)

Following concerns that CRM was coming from foreign tires, new federal rules are in place to ensure that CRM comes from domestic tires. These rules require 'chain of custody' reporting that tracks the history of CRM supplied to paving projects. There is still no guarantee that CRM used in California comes from discarded California tires. Additionally, the protocol embedded in these rules will allow verification of the actual quantity of CRM used asphalt binders, including "terminal blend" or "no agitation" binders.

Binder Considerations when Using RAP & RAS (Steve Escobar, APART)

As asphalt pavements are targeted for including more reclaimed asphalt pavement (RAP) millings and reclaimed asphalt shingles (RAS), it has become increasingly important to understand the overall effects on the resulting asphalt binder and mix properties. Therefore, most agencies are now using a "% binder replacement" criteria to control how much reclaimed material can be

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used without excess hardening of the resulting binder. For example, a limit of 3-5% binder replacement is a common specification for limiting RAS use. Recycling agents and longer plant mixing time may also be required. Other concerns involve the potential for premature pavement cracking with the use of RAP and RAS, along with lime treatment in very hot (desert) climate areas.

Portable Skid Testing Device (Tim Greutert, Caltrans)

Caltrans is moving toward expecting more skid testing by contractors – possibly on fog sealed asphalt pavement, in addition to new PCC surfaces. A new portable skid tester will be specified, and it must be compliant with a new Caltrans test method, CT114A. This new portable tester, on display at the Conference, is placed on the pavement behind a pickup truck. A small spinning rubber tire is lowered to contact the pavement, and the friction properties are determined. Plans for this device are available from Caltrans. The estimated cost to fabricate it is \$18-25K.



Figure 4. Lance Brown of Caltrans and Dr. Ding Cheng of CP²C Check Out Caltrans' New Portable Skid Tester

Material Transfer Vehicles (MTV) and Smoothness (Jeff Ensell, Roadtec)

Material Transfer vehicles (MTV, aka., shuttle buggies) are gaining more prominence in California paving projects, especially since Caltrans now requires them for placing rubberized HMA, the surface lift of choice by Caltrans. MTVs might be thought of as a 'silo on wheels' in that they operate ahead of the paving machine to accumulate and store HMA from delivery trucks. In this role, they keep mix hot, and provide a remixing function to minimize segregation. They also help provide

uniform temperature throughout the fresh HMA mat. They promote smoothness because they enable the paver to move continuously with fewer stops, and eliminate the frequent contact between the paver and the haul trucks, which often causes bumps in the finished mat. The uniform mat temperature promotes better, more efficient compaction. MTVs can be coupled with an infrared scanning bar near the screed to give a continuous visual image of temperature distribution across the new mat. On higher speed roads, where smoothness is an important factor, MTVs can be a big help.

Meeting Caltrans Smoothness Specification (Mike Robinson, P.E., Consultant)

The Caltrans specification for pavement smoothness now uses the International Roughness Index (IRI) measured by inertial profiler devices, usually mounted on pickup trucks. The measurements are made at highway speeds and the data analysis is fully automated. This can be pretty unforgiving to a paving contractor. Final smoothness is dependent on the number of "opportunities" a contractor has for improvement. Some paving practices for creating opportunities and obtaining pavement smoothness include the following:

- Pre-mill an existing rough pavement surface;
- Use CIR to produce a fresh, smooth base for paving;
- Minimize stops and starts - both during pre-milling and paving;
- For deeper rutting, use a leveling course with a rubber-tired roller;
- Use windrow paving or MTV to minimize stops & starts of the paver;
- Use a lift thickness at least 3X greater than the mix aggregate size; and
- Build smooth transverse joints.

From an agency perspective, it is probably better to place an additional lift to obtain smoothness (rather than diamond grinding), because an additional lift will add to the pavement structure.

Intelligent Compaction for CIR (Don Mathews, Pavement Recycling Systems)

Caltrans has initiated several pilot projects involving the use of Intelligent Compaction (IC) on cold in-place recycling (CIR) projects. It's likely that IC will eventually be used on most HMA paving projects as well. For IC, the rollers

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are equipped with accelerometers that can measure the mat stiffness, which can be correlated to density as measured by a nuclear gauge. The roller is also equipped with GPS technology that provides spatial information, resulting in the ability to 'map' pavement compaction and provide real time feedback to the roller operator. The IC technology also allows for pre-mapping the condition of the old pavement to identify soft spots and other areas where preliminary repairs would be beneficial to the overall pavement life. IC is generally seen as a good quality control tool for contractors.

Asphalt Rubber Blending

(Jack Van Kirk, George Reed, Inc.)

The continued increased use of asphalt rubber

requires a well defined set of rules for blending the crumb rubber into the hot base asphalt to obtain a homogeneous blend. In addition to controls on the base asphalt and the rubber particle size, the blending equipment and process must be closely controlled.

The process requires a post-blending reaction tank with heating and agitation for at least 45 minutes. Testing on the finished blend includes a field measurement of viscosity by a portable hand-held rotational viscometer. Other tests, done in a lab setting, include cone penetration, resilience and softening point.

For more information on all the presentations at the Conference visit the CalAPA website at: www.CalAPA.net



Caltrans Section 39 Class Overview

By Roger Smith, CP² Center and Russell Snyder, CalAPA

Caltrans Section 39 Update Classes

CalAPA's popular classes on Caltrans Section 39 HMA Specifications and Superpave have been a big success. The half-day "Critical Changes to Caltrans Section 39 Hot Mix Asphalt Specifications" classes were held in San Diego, Fontana, Bakersfield and Fresno. Enrollment is now open for classes in Hayward, January 6 or 7. Other dates and locations are planned. A flier about the class is at: <http://calapa.net/CalAPASection39Flier.pdf>

The class, developed under the guidance of the CalAPA Technical Advisory Committee of pavement experts, and reviewed by Caltrans, covers all major changes to the Caltrans specifications, testing and acceptance as they relate to asphalt pavements, including "Superpave."

It is a must for engineers, designers, technicians, paving contractors, agency personnel and anyone else involved in asphalt pavements. The class was made possible through the generous support of CalAPA members.

The instructor is Paul Curren, P.E., who previously taught this class to more than 500 around the state in 2010 and 2011 to rave reviews. He has years of practical experience working for local agencies and industry. His colorful admonishment, "Do it once, do it right, go home and get paid" has become an oft-repeated catchphrase for the road-building industry in California.

For more information go to the CalAPA website: www.calapa.net



Asphalt "User-Producer" Committees Meet

By Roger Smith, CP² Center

The active Committees of the Pacific Coast Conference On Asphalt Specifications (PCCAS) met at the University of Nevada, Reno (UNR) on October 20 & 21. The PCCAS (aka. User-Producer Group) is a long-standing forum for state DOT's to meet with asphalt suppliers in the interest of using proper specifications for asphalt. Representatives from FHWA, California, Nevada, Oregon, Washington, Alaska and Hawaii participate, making this a valuable forum for exchanging technical information. Here's an overview of the various ac-

tivities of the Committees.

Paving Asphalt Committee

MSCR – The Multiple Stress Creep Recovery (MSCR) test is a new test (AASHTO T350) and possible specification for asphalt binder's high-temp properties using the DSR test machine. A round-robin involving 16 labs was completed via the Asphalt Institute and found that precision and bias look comparable to other PG tests. It appears that State DOT's and asphalt suppliers prefer a 'go slow' position and fur-

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ther review of data from shadow (report only) testing being done on binders. At present, Washington is the only state DOT planning to implement the MSCR test – probably in 2016.

Rubber Additives – Work is continuing on using PG grading methods for rubberized binders and using the DSR for testing asphalt rubber (AR) binders with coarser crumb rubber (e.g. California type). A new test method using the plate-to-plate DSR with a 3mm gap has been developed, and round-robins have been completed with 15 labs participating. The initial conclusion is that the precision of this test method looks good, although there are some problems with oven-aging of the specimens for testing.

Emulsion Committee

Activities of the Emulsion Committee are focusing on coming up with a better method for obtaining the emulsion's asphalt residue for testing purposes. The primary concern is that overheating the emulsion to evaporate the water may be altering the properties of the residue, especially polymer (latex) additives typically used in chip seal emulsions (e.g. PMCRS-2). A gentler method involving realistic field temperatures is being sought. Ultimately, this group hopes to use the PG grading system to characterize the asphalt residue from emulsions. Various methods for doing this are being looked at nationwide. A laboratory correlation program is also being considered –

similar to those of Oregon DOT and Saskatchewan DOT.

Recycling Committee

The state DOT's gave updates on their recycling policies with the general finding that most states now allow both reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS) in their HMA. Some states allow a maximum amount of "binder replacement" due the combined effect on RAP & RAS. Nevada and Alaska only allow RAP at present, no RAS. The amount of RAP allowed for surface lifts ranged from 15% to 25%. For lower lifts, the allowable RAP amount is as high as 40% .

Dr. Ding Cheng of the CP² Center reported on the CIR project on SR198 near Lemoore, CA.

Mix design research in Nevada is showing that lime additive can greatly improve moisture sensitivity (T-283 results), "engineered" emulsions give better performance, and rut resistance of the CIR mix is generally good.

There was concern expressed over early cracking in a high desert project in California which used 15% RAP and lime treatment with a PG70-10 binder.

These committees will meet again on February 23-24, 2016, at UNR in Reno, and a full PCCAS Conference is planned for May of 2016.

For more information on PCCAS go to: www.pccas.org



Tack Coat Best Practices Workshops

By Sri Holikatti, Caltrans

A half-day workshop on tack coat use in HMA paving was conducted in Sacramento on November 10, 2015, jointly



Figure 1. A Full House for the Tack Coat Workshop in Sacramento

by Caltrans, Federal Highway Administration (FHWA), Asphalt Institute, CalAPA and California Chip Seal Association. Over 75 participants from Caltrans, local agencies and industry attended and learned about the best practices in tack coat use. A second workshop was also held in southern California at the Caltrans Southern Regional Lab on November 12.

Jason Dietz with the FHWA Lakewood (Colorado) Resource Center, and Robert Humer, District Engineer with Asphalt Institute, made informative presentations. A wide range of topics was covered, including:

- Importance of tack coats
- Materials selection and handling

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- Specifications and guidelines
- Application and inspection
- Equipment and testing

The workshop was held in an open discussion format with active participation and information exchange between the attendees and presenters. Tack coat practices in other states were also briefly discussed along with new tack coat products available in the market. Here's some 'take-aways' from the Workshop.



Figure 2. Tack Coat Nozzle Coverage

Tack coats are essential for overlays to ensure bond with underlying layers so that the multiple layers can act as one monolithic layer capable of resisting bending under applied traffic loads. Absence or inappropriate application of tack coat results in loss of structural strength and various pavement distresses such as premature cracking, shoving, rutting, slipage and delamination requiring premature maintenance treatments - or sometimes even early rehabilitation. Tack coats should usually also be applied between HMA lifts in new construction, although at a lower application rate. Studies indicate that the absence of, or insufficient amount of tack coat can reduce pavement fatigue life by 50 – 70 percent, for 10 – 30 percent bond loss.

The most widely used material for tack coat applications is asphalt emulsion, while occasionally neat (hot) 'PG' asphalts are used. Also, neat (unmodified) asphalt emulsions are more widely used than Polymer Modified Asphalt Emulsions (PMAE). Neat asphalt emulsions consists of a minimum of 57 percent asphalt by volume and the remaining 43 percent being water and small amounts of emulsifying agents. PMAE's contain about 67 percent modified asphalt. Caltrans specifies the required residual asphalt rate for tack coats,

which is the amount of asphalt left behind after the water has evaporated (see below).

The selection of the right tack coat material is dependent on location, environmental conditions, time of construction (summer or fall) and construction shift (day or night). In California, SS-1h is the most used tack coat emulsion. The suffix 'h' indicates the use of harder (low penetration) base asphalt in the emulsion. Studies suggest that harder base asphalt emulsions result in better bonding and higher bond strength. Hot 'PG' asphalts have also been used in cooler, high humidity conditions (e.g., night work).

Knowledge of emulsion dilution by additional water is extremely important for tack coat application. Application rates less than 0.10 gal/yd² are not practically possible, so it becomes imperative to dilute the emulsions for use. The maximum dilution allowed in California is 1:1 (1 part asphalt emulsion to 1 part additional water). The application rate is also a function of dilution. Depending on the dilution, the application rate will vary so that the specified amount of residual asphalt is applied.

The final important factor is the application rate of tack coat, which varies with the condition of surface being applied. Generally rough, older or oxidized surfaces require higher application rate than newer and smoother surfaces. Application rate determines the bond development between the layers. As mentioned above,



Figure 3. Good Tack Coat Coverage

it's very important to verify the dilution rate so the proper application rate can be calculated to yield the specified amount of residual asphalt. (For example, an SS-1h emulsion, diluted 1:1 with added water, would have to be sprayed at about 0.8 gal/yd² to yield a residual asphalt of 0.03 gal/yd²). The actual application rate can be calculated [Continued, next page](#)

by determining the weight or volume of the applied material and the area it covered.

It should also be mentioned that surface preparation is one of the most important factors affecting the overlay bond development. Existing surfaces must be cleaned using equipment such as vacuum brooms. Unclean, dusty surfaces reduce bond formation. While Caltrans does not specify bond strength tests for overlays, some state transportation agencies do.

The types of tests available are shear, tension and torsional (after core cutting).

In summary, tack coats are essential for bonding and overlay performance. Tack coat cost is insignificant - only about 1 percent of total pavement cost, but lack or partial bonding contributes to serious loss of fatigue performance and premature pavement distresses requiring additional repairs or rehabilitation that can cost from 30 – 100 percent of the original pavement costs.



Data Needed for Performance Modeling for Rubberized Asphalt Chip Seals (Phase II) By Ding Cheng and R. Gary Hicks, CP² Center

The Department of Resources, Recycling and Recovery (CalRecycle) currently promotes the use of waste tires in various pavement strategies as part of their ongoing efforts to divert waste tires from landfills in California. In an effort to improve these strategies, CalRecycle would like to quantify the benefits of using asphalt rubber (AR) and terminal blends (TB) rubberized asphalt in chip seals. The potential cost savings could be substantial; however, there is a real need to measure and document the differences in field performance and the resulting savings. Most of the information to date has

been anecdotal.

In Phase I of this study, the Center developed performance models for asphalt rubber hot mixes (RHMA) using data from Caltrans and local agencies. The improved performance of RHMA mixes was clearly demonstrated for all the projects investigated. In Phase II, the Center is proposing to do the same for rubberized chip seals using various products including AR, TB, as well as conventional and polymer modified emulsions. An example of the model developed in Phase I of this study is given in Figure 1.

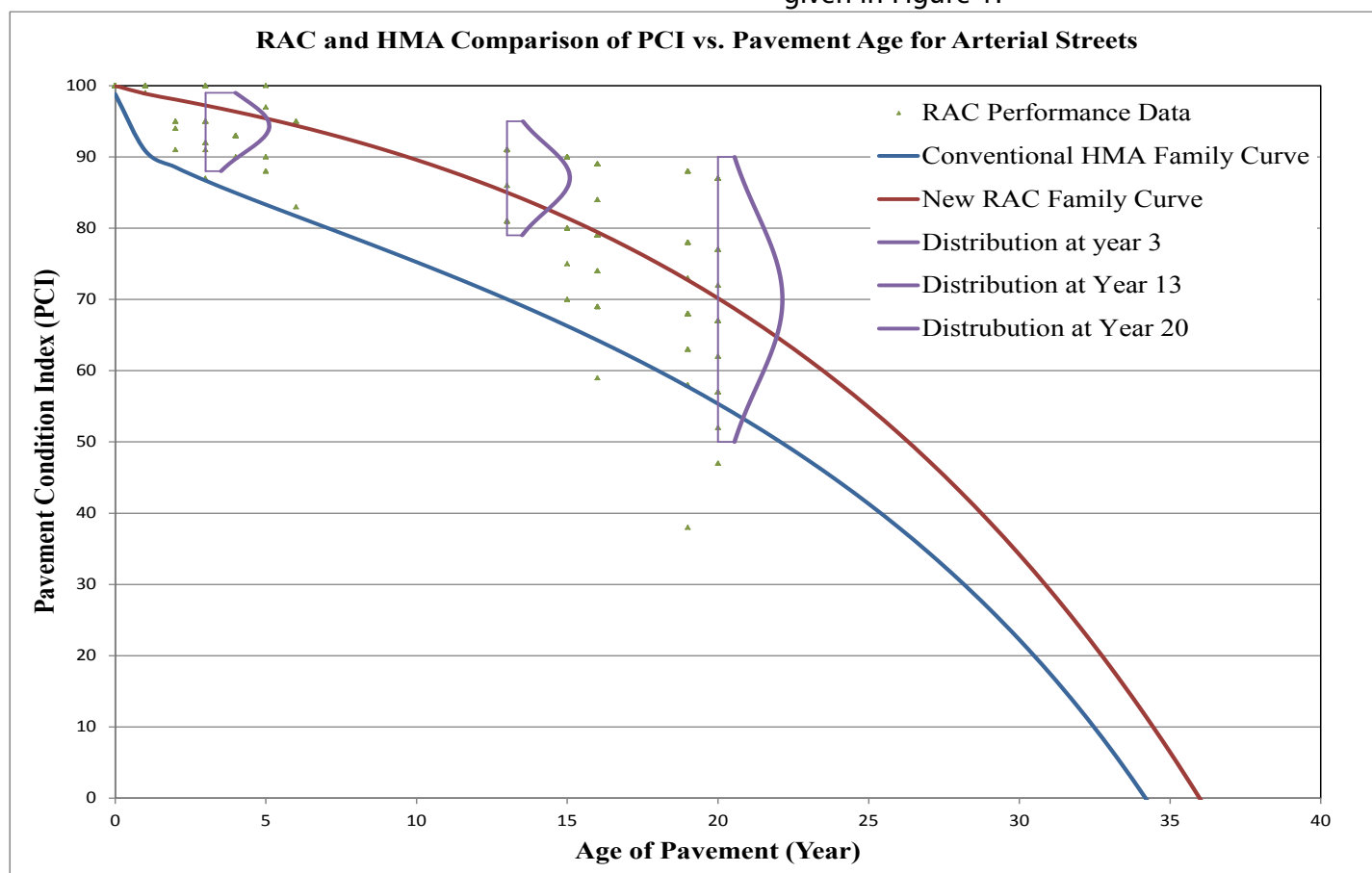


Figure 1. Typical Performance Curves for Different Mixes

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Project Objectives

The objectives of phase II of this project are as follows:

- Document and monitor the performance of chip seals in the state of California including AR and TB binders, as well as those containing conventional and polymer modified emulsions.
- Develop performance curves for each type of the chip seal product.
- Implement the findings of this study. The models developed in this study should be implemented by working with selected agencies throughout the state including the Metropolitan Transportation Commission (MTC), County of Los Angeles (LA), City and County of Sacramento, and other agencies.
- Develop education and outreach materials that incorporate the rubberized chip seal performance curves as well as the performance curves for RHMA.
- Contact local agencies to share the educational and outreach materials and work with them on using the new performance curves in their pavement management systems.

Work Tasks

The plan described below outlines the work to be done as a part of this project. It is divided into 5 separate tasks. Each task is discussed below in detail.

- Task 1- Work Plan: This task will consist of the development of a detailed work plan for all activities contained in the project scope of work, including the required reports for the project.
- Task 2 - Develop Performance Curves by Documenting the Performance of Chip Seals: This task will include the collection of information to develop performance curves for the chip seals typically used in California. The task includes developing models for the following types of chip seals:
 - ~ Asphalt rubber with and without Warm Mix Additives (WMA)
 - ~ Terminal blends
 - ~ Conventional and polymer modified emulsions
- Task 3 - Integrate performance models for RHMA and chip seals into the PMS used by local agencies: This task will integrate

and calibrate the performance curves into the PMS of select local agencies that use StreetSaver, Micropaver, and Stantec PMS for rubberized HMA and chip seals. Also as part of this task we will identify the most widely used PMS's by local agencies. At the present time, they include publicly available systems like StreetSaver and Micropaver as well as the Stantec System (used by LA County and the City of Sacramento). The project team will focus on the most widely used systems.

- Task 4 - Dissemination of Information: The purpose of this task is to share with the agencies information on the performance of the various chip seal strategies.
- Task 5 - Reports: This task includes developing the different types of reports to be delivered to CalRecycle.

The project started in August 2015 and will be completed in May 2017.

To further this study, we are looking for data from local agencies on the types of chip seals they have used, and whether we can gain access to some of their project files and data to



Figure 2. Chip Seal Application

help with the development of the performance curves. If your agency uses chip seals (conventional, polymer modified, terminal blends, or asphalt rubber), please contact either Ding Cheng or Gary Hicks at the CP2 Center. **We are looking for projects in various parts of the state, urban and rural, of various ages, and most importantly performance information that is contained in the agencies pavement management system so we can develop performance curves for the various chip seal products.**

For more information please contact Dr. Ding Cheng at: dxcheng@csuchico.edu or Dr. Gary Hicks at: rg Hicks40@outlook.com



Caltrans Concrete Preservation Practices

By Robert Hogan, Caltrans and R. Gary Hicks, CP² Center

Caltrans has used portland cement concrete for many years on Interstate and mainline pavement. Most of the early concrete pavements consisted of an undoweled, jointed concrete pavement over an erodible cement-treated base. This resulted in some distress at the joints such as pumping and faulting which lead to rough ride quality. Many of these pavements initially received rehabilitation treatments to repair the damage under heavy traffic including, crack and seat with an asphalt overlay.

Presently, many of the concrete pavements are being maintained using preservation treatments such as:

- Spall repair
- Diamond grinding
- Dowel bar retrofit with diamond grinding
- Slab replacement

Diamond grinding is the oldest concrete preservation treatment used by Caltrans, to improve ride quality, originating in the 1950's. Caltrans has found that diamond grinding alone can extend the pavement service life



for roughness between 15-20 years based on the average time until the international roughness index (IRI) increases 78%. New innovations such as the next generation concrete surface have been used to produce even quieter pavement

than traditional grinding.

Spall repair has also been used for many years to address durability issues at the joints and at some load related cracks. A new spall repair standard plan and updated specifications were adopted in 2013 to reflect national best construction practices recommended by the National Concrete Pavement (CP) Tech Center. Polyester concrete is typically the current material of choice to provide superior bonding with increased tensile strength and a lower modulus of elasticity than portland cement concrete. A typical spall repair at a joint using polyester concrete can be seen in the photo in Figure 1.



Figure 1. Typical Spall Repair at a Joint using Polyester Concrete

Dowel bar retrofit has been used in California for about 10 years to improve load transfer across the transverse joints. Early concrete pavements used in California relied on aggregate interlock and slabs lost any load transfer once the aggregate deteriorated at the joint. This preservation technique consists of inserting dowels into the wheelpaths of the concrete pavements using cementitious products to lock them in. Caltrans recently began using polyester concrete to backfill dowel slots to improve performance. Figure 2 illustrates a successful DBR project.



Figure 2. A Successful Dowel Bar Retrofit Project

When the slabs settle or are cracked into three or more pieces, such as the one shown in Figure 3, Caltrans uses slab replacement.



Figure 3. Third Stage Cracking in a PCC Slab

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This technique requires the removal of the distressed slab and replacement with an entirely new slab. In urban areas, most of this work is done at night, while in some rural areas (depending on the traffic) the work can be done during the day. One of the challenges for this technique is to make sure the contractor gets in and out quickly to prevent delays to the travelling public.



Figure 4. Preparation for Slab Replacement

Products used must either set up quickly or be precast as shown in Figure 4 and Figure 5.



Figure 5. Precast Slab for Replacement

Caltrans has recently developed a concrete pavement guide which describes the preservation and rehabilitation techniques currently used by the agency and provides criteria for selecting the best strategies to use. The guide can be found at the following link:

http://www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement_Engineering/Concrete_Pavement_Guide.shtml



Quieter Pavement Research in California

By John Harvey, UCPRC (Davis); Irwin Guada, UCPRC (Berkeley); and Linus Motumah, Caltrans

In the early 2000s, the California Department of Transportation (Caltrans) identified a need for research to evaluate noise and other surface texture characteristics of concrete pavements on the state highway network. To accomplish this, Caltrans partnered with the University of California Pavement Research Center (UCPRC) to conduct a four-year research on tire/pavement interaction noise, pavement smoothness, and surface drainability characteristics of three commonly used concrete pavement surface textures in California: diamond ground, diamond grooved, and longitudinally tined. A parallel study, presented in a separate report, was conducted to evaluate noise reduction benefits of an experimental grind-and-groove procedure.

Objectives of the Study

The objectives of this study were:

- Evaluate acoustic characteristics of noise generated by tire/pavement interaction on concrete pavement surface textures commonly used in California.

- Evaluate smoothness and drainability characteristics of concrete pavement surface textures.
- Determine the effects of surface texture type, condition, age, and smoothness on tire/pavement interaction noise.
- Determine the effects of surface texture type on drainability of concrete pavements.
- Develop recommendations for safe, durable, and cost-effective concrete pavement surface textures that minimize tire/pavement interaction noise.

Test Sections

In the first year, the study evaluated 119 test sections selected at 47 locations throughout the state. Some of the test sections were dropped in the second and third years either because construction had changed the surface texture or they were in an advanced state of deterioration. This created an imbalance in the number of commonly used textures from the

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original plan; which was corrected by adding 37 new sections to the 23 left from the original plan. The test sections were located throughout the state.

The 60 sections evaluated in the fourth year consisted of 27 diamond ground, 12 diamond grooved, 19 longitudinally tined, 1 burlap drag, and 1 longitudinally broomed. Five of the 60 sections were continuously reinforced concrete pavement and the rest were jointed plain concrete pavement.

Test Measurements

Field measurements included tire/pavement interaction noise using the on-board sound intensity (OBSI) method; pavement smoothness in terms of the International Roughness Index (IRI) using a wide-spot laser (Figure 1); and

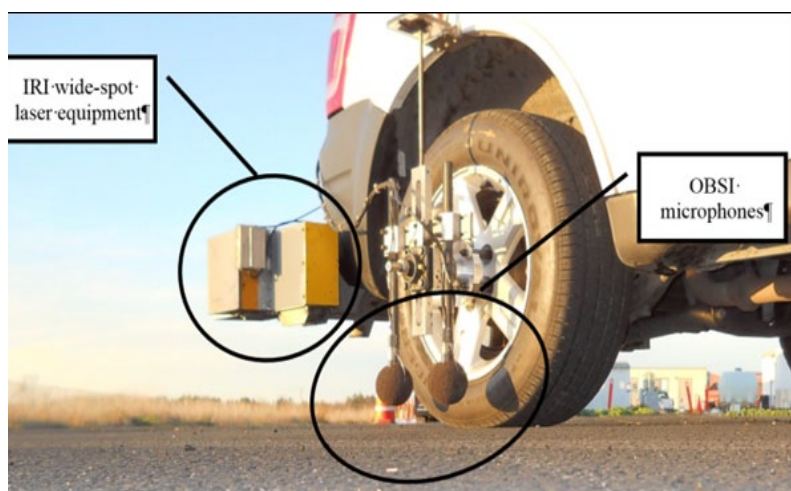


Figure 1. UCPRC OBSI and IRI Test Vehicle with Mounted Microphones and Wide-Spot Laser Profilometer

drainability using outflow meter and Mean Profile Depth (MPD) measurements (Figure 2). Most of the test sections were evaluated within 15 years of original construction or the last retexturing.

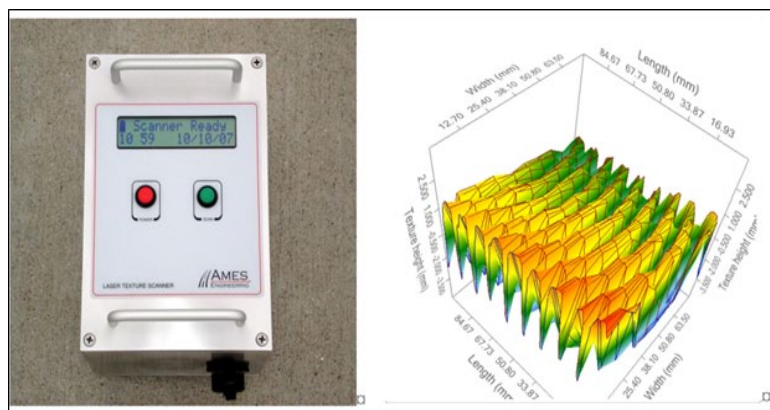


Figure 2. Laser texture scanner (LTS) and an example of a surface texture profile it measured (Photo of LTS courtesy of Ames Engineering Inc.)

Results of the Study

The results of this study are reported in "Investigation of the Tire/Pavement Noise for Concrete Pavement Surfaces: Summary of Four Years of Measurements" (UCPRC-RR-2013-12), which can be found in the UCPRC website at: <http://www.ucprc.ucdavis.edu/PDF/UCPRC-RR-2013-12.pdf>. In summary, the following characteristics were observed for the three texture types – diamond grind (DG), diamond grooved (Gr) and longitudinally tined (LT):

- The OBSI noise levels of the 60 sections ranged from 100 dBA to 112 dBA.
- The average overall OBSI levels for the DG, Gr, and LT sections ranged from 104 to 107 dBA; with DG and Gr typically quieter than LT textures.
- The OBSI sound frequency contents for the DG, Gr, and LT sections were similar; with maximum levels occurring between 800 and 1,000 Hz.
- The OBSI noise level versus texture age showed wide scatter. For the 23 sections that were evaluated for four years, average OBSI increased at rates of 0.1, 0.3, and 0.8 dBA/year for the LT, Gr, and DG, respectively.
- OBSI noise level and IRI roughness measurements didn't show a statistically significant correlation, but test sections with higher IRI values (i.e., rougher pavements) typically had higher OBSI levels.
- The average IRI roughness values for the DG, Gr, and LT sections were 68, 81, and 96 in/mi, respectively.
- The outflow meter and MPD measurements indicated that diamond grooved (Gr) had a greater drainability capacity than DG and LT textures. This finding suggests that diamond-grooved concrete pavements would generally be more effective in reducing the risk of hydroplaning than diamond-ground or longitudinally tined concrete pavements.

Recommendations

This study made the following recommendations:

- Continue to use diamond grind and diamond grooved to retexture existing concrete pavements to improve friction and smoothness; and to reduce hydroplaning and traffic noise.

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- Develop specifications for longitudinal tining that limits positive texture on new concrete pavements.
- Develop specifications for measuring OBSI noise levels at the completion of new or pavement preservation / rehabilitation projects.
- Conduct further study to evaluate the effects of concrete pavement texturing procedures on smoothness for new construction and reconstruction to determine whether diamond grinding or grind-and-groove texturing are viable substitutes for longitudinal tining.

For more information view the full report at: <http://www.ucprc.ucdavis.edu/PDF/UCPRC-RR-2013-12.pdf>

Grind-and-Groove Experimental Texture Study

A separate parallel study comprised of seven pilot projects was conducted to compare OBSI levels and other surface texture characteristics for existing concrete pavements after retexturing using conventional diamond grind (CDG) and the experimental grind-and-groove (GnG) procedure (aka. Next Generation Concrete Surface). The results are published in a 2014 report titled: "Evaluation of Grind-and-Groove (Next Generation Concrete Surface) Pilot Projects in California," UCPRC-RR-2013-01, which can be found at: <http://www.ucprc.ucdavis.edu/PDF/UCPRC-RR-2013-01.pdf>. The results were also reported in the December 2012 issue of the CP2C Newsletter.

The seven pilot locations consisted of projects scheduled for CDG. They included one each in San Diego, San Joaquin, and Yolo counties, and

four in Sacramento County. OBSI, IRI, and drainability measurements were made on CDG and GnG sections before and after construction; and in between initial and secondary grinding/grooving for the GnG sections.

The findings indicated that:

- The average OBSI noise values of the GnG sections ranged from 99.5 dBA to 101.7 dBA, with an average of 100.8 dBA.
- The average OBSI noise values of the CDG sections ranged from 100.6 dBA to 104.7 dBA, with an average of 102.8 dBA.
- On average, the experimental GnG sections were quieter than the CDG sections by approximately 2 dBA.
- Both GnG and CDG textures improved smoothness substantially. The average roughness values improved from 142 in./mi before retexturing, to 64 in./mi after CDG and 49 in./mi after GnG.

Recommendations

- Continue development and implementation of the GnG texture, especially for use in noise-sensitive areas.
- Monitor the seven locations to determine the long-term acoustical, friction, and IRI performance of both the GnG and the adjacent control CDG textures.
- Based on relative cost-effectiveness in reducing OBSI and IRI, use of GnG in noise sensitive areas and CDG where improving ride quality is the primary goal are recommended.

For more information go to: <http://www.ucprc.ucdavis.edu/PDF/UCPRC-RR-2013-01.pdf>



Joint Training and Certification Program Moving Forward

By Roger Smith, CP² Center

Caltrans is moving forward with a Joint Training and Certification Program (JTCP) for field material testers working on Caltrans projects. Joe Peterson, former Chief for the Office of Roadway Materials and Testing Services of Caltrans, has been assigned as the Project Manager for this big effort.

This "joint" program will ultimately offer training and certification jointly for both Caltrans and Industry technicians in the testing of soils, aggregates, hot mix asphalt (HMA) and portland cement concrete (PCC) with the objective of:

- Providing highly skilled, knowledgeable materials sampling and testing technicians
 - Promoting uniformity and consistency in testing
 - Providing quality improvement
 - Creating a harmonious working atmosphere between public and private employees based upon trust, open communication, and equality of certification
- Caltrans tester certification requires testers to provide proof of training, take a written test

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and perform the test in the presence of Caltrans Independent Assurance representative. Currently there is no provision for the joint training and certification of both Caltrans and Industry technicians.

As the first phase of the program, an interagency agreement is being set up with Cal State, Long Beach, to develop the training curriculum for asphalt, soils, and aggregate. For PCC, the existing program of the American Concrete

Institute (ACI) will be used.

After the training curriculum is developed, a later phase of this effort will handle the implementation and execution of the program. The expectation is that approximately 1000 certifications will be issued per year through the program. Certifications will be good for 3 years.

For more information contact Joe Peterson with Caltrans at: joe.peterson@dot.ca.gov



2015 MSA Annual Conference

The Maintenance Superintendents Association (MSA) is a partnership of municipal service employees and commercial suppliers (vendors) dedicated to the maintenance of vital public infrastructure and the ongoing education and training of our members.

This year the San Diego Area Chapter hosted the Annual Conference September 29 – October 1 at the Crowne Plaza hotel. They set out to provide meaningful training – including hands-on and vendor demonstrations, vendor exhibits, topical keynote speakers, fun fishing, golf and spousal events and overall memorable times for the attendees.

A big part of these Conferences is providing training, and a wide array of classes was available on a variety of public works topics, including asphalt pavement maintenance and concrete fundamentals.

By Susie Evans, MSA San Diego

vendors who set-up indoors with tabletop displays and outdoors with pop-ups and equipment. Also, to help agency attendees have the opportunity to check out the vendors in between training, there were classes held both indoors and outdoors near the vendor display areas.



Figure 2. Sign Assembly Competition

In 2014, the MSA's vendor representatives initiated a new award for the "Stellar Vendor of the Year". The very first recipient of that award was Norman L. Hawkins, Jr., nominated by San Francisco Bay Area Chapter. Nominees for 2015 were: Erick Gustafson (Zumar Industries) nominated by Inland Empire/Desert Chapter, Dennis Philbin (Traffic Management, Inc.) nominated by San Diego Area Chapter, Tim Powers (MME) nominated by North Central Valley Chapter, Steve Rasmussen (Traffic Management, Inc.) nominated by Los Angeles/Orange Area Chapter, and Frank Wheeler III (MME) nominated by San Francisco Bay Area Chapter. The winner for 2015 was Erick Gustafson with Zumar Industries.

Another special event was "Orange Shirt Day", where over 100 field crew workers came out to start the day with the other agency attendees and vendors for a delicious breakfast and message from Keynote Speaker Dan Singer, Poway City Manager, who spoke about strategic planning in public works. *Continued, next page*



Figure 1. Part of the Busy Vendor Area at MSA

Another primary objective of this annual event is to showcase the MSA vendors who provide the materials, supplies, and equipment needed for Public Works. Their continued support for the conference training events and vendor show is greatly appreciated. There were 55

Afterwards, attendees participated in training and visiting the vendor exhibits, and an exciting new twist to the Annual Conference was the addition of an “Agency Skills Competition”, where the agencies entered a 3-person team to compete in three skills events: sign assembly, a wheelbarrow obstacle course and backhoe operation. The cities competing were Encinitas, Poway, Chula Vista, Carlsbad, San Diego, and Lemon Grove. Team Poway was the winner.

The nominees for the Peter W. Walsh Award were also recognized. In 1978 Mr. Peter W. Walsh of Oakland, California, donated a bronze sculpture to MSA. The sculpture depicts the various phases of work a Maintenance Superintendent is involved in on a daily basis, and serves as the award. Nominees for the Peter Walsh Award were:

Gerard Batista (City of San Gabriel) nominated by Los Angeles/Orange Area Chapter, Doug Blackstock (City of Del Mar – retired), nominated by San Diego Area Chapter, Randy Carnahan (County of Santa Barbara) nominated by Central Coast Chapter, Tsutomu Imamura (San Mateo County – retired) nominated by San Francisco Bay Area Chapter, and Lyle Waite (City of West Sacramento) nominated by North Central Valley Chapter. Later that night, attendees joined together for a special tribute to the recently departed Beverley Copeland for her generous and meaningful contributions to MSA for so many years. Lory Warren, the 2014 Peter Walsh awardee, announced Lyle Waite, City of West Sacramento, as the 2015 Peter W. Walsh winner.

For more information on MSA go to: www.mainsupt.com



Local Agencies Must Step Up

By Sui Tan, Metropolitan Transportation Commission

If you're frustrated by Congress failing to pass a long-term transportation bill, you're not alone. A few states have passed gas tax measures in order to continue to fund their transportation investment. Also, some local agencies have successfully passed sales tax measures. If your agency is in the same boat of having ailing infrastructure with no means to raise a dedicated source of funding for road maintenance, it may be time to step up to the plate. It happened to Bay Area agencies in 2001.

Funding Advocacy and Policy

Following completion of the Metropolitan Transportation Commission's (MTC) 2001 Regional Transportation Plan (RTP), concerns were raised by a number of local transportation officials regarding the small amount of regional discretionary funds that were committed to local streets and roads maintenance and rehabilitation (M&R). Local M&R work received \$143 million, representing less than two percent of the total allocation. The disparity was due in part to the perception that local streets and roads were more of a local issue and not a regional priority.

As a result, public works directors and transportation managers from cities and counties throughout the Bay Area began meeting to discuss how to rectify this perception. These efforts led to the formation of the Local

Streets and Roads Working Group (LSRWG), a working group of the Bay Area Partnership that advises MTC on transportation policy. The LSRWG has been able to work with MTC staff to collect current and accurate data that identifies the scope of the problem in the region. This effort brought attention to the magnitude of the Bay Area's local streets and roads maintenance problem and developed a more comprehensive estimate of the funding shortfall and a broader constituency. The LSRWG's latest effort helped secure a \$10 billion commitment to local streets and roads in the 2013 RTP.

While staff from MTC has long been working with cities and counties individually to help them improve the condition of their local streets and roads network, MTC struggled to get jurisdictions interested in regional-level issues because of the diverse nature of the region. However, with the formation of the LSRWG, a policy domain was created for advocating for additional local streets and roads funding, as well as identifying “best practices” maintenance strategies.

In addition to the partnership that formed between MTC and the LSRWG, the mere fact that LSRWG exists, means that the 109 separate agencies have a vehicle for sharing information with one another on funding opportunities, maintenance strategies, legislative initiatives that should be

Continued, next page

supported, and other issues that are important to local streets and roads interests.

Regional Policy Promotes Pavement Preservation

MTC, working together with the LSRWG, has also been able to get local jurisdictions to agree to conditioning regional funds for maintenance on performance. For example, maintenance projects will not be approved for funding unless the streets nominated for treatment are recommended by the jurisdiction's pavement management software. This ensures that the regional funds will be spent in a responsible manner, since our StreetSaver® program ranks those roadways that should be treated first, based on their cost effectiveness score. Also, in distributing shares of main-

tenance funds across the region, MTC allocates partially on the basis of the jurisdictions' performance in pavement preservation strategies. Simply put, those jurisdictions that apply effective maintenance strategies get more funding. The fact that local jurisdictions agreed to these performance-based conditions is a reflection of the positive effect that MTC has had in improving maintenance strategies in the region. Local jurisdictions have recognized the fact that requests for funding must be coupled with accountability and have adjusted their maintenance strategies accordingly.

So start looking around, seek out the champion in your agency, and work with your MPOs or RTPAs in your region to improve funding for your M&R needs.



MAP-21 Requirements for Pavement Smoothness

By Steve Healow, FHWA Sacramento Division

On February 17, 2015 a Notice of Proposed Rulemaking (NPRM) was published in the Federal Register entitled "National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program". The NPRM was mandated by Congress in the "MAP-21" legislation, Section 1203 "National Goals and Performance Management Measures", wherein Congress directs state and local agencies, which own and operate routes on the National Highway System (NHS), to collaborate in (a) establishing performance targets pursuant to the proposed performance measures, and (b) collect and submit condition data on pavements and bridges in accordance with the Highway Performance Monitoring System (HPMS). HPMS was established in 1978 NH to provide NHS data and analysis for the bi-annual condition and performance report to Congress.

The NPRM is merely a proposed rule. It is a draft regulation which is circulated for public comments. The public comment period ended May 8. Public comments will be addressed in preparing the final rule, which is expected to be published approximately April 2016.

The NPRM includes four proposed metrics for measuring NHS pavement condition: International Roughness Index (IRI), percentage of cracking, and either percentage of rutting or faulting in each pavement section.

Coincidentally, State DOTs have been submitting data on these same four metrics with their annual HPMS data submittal since 2010. The aggregated data will be used to classify percentages of lane-miles in good, fair, and poor condition. Table 1 below is a summary of proposed data collection standards. Table 2 is a summary of proposed pavement condition ratings.

Caltrans is in the first year of a three-year contract with Pathway Services, Inc. to conduct two automated pavement condition surveys. Pursuant to this contract Pathway will be collecting data for the four proposed metrics on all of California's NHS, including the 7,000 miles of urban arterials owned and operated by local agencies. So at least for the duration of this contract the required data submittal is covered, and local agencies won't have to provide this data.



Most readers of this column are familiar with the National Highway System (NHS). It is comprised of all interstate plus selected intermodal connectors, strategic and military access routes. The NHS was expanded by MAP-21 from 163,000 miles (7,155 in California) to 223,000 miles (14,149 in California). Most of the new NHS routes are urban arterials. The NHS carries approximately half of all Vehicle Miles Traveled (VMT), on only 5% of public road miles.

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Table 1. A Summary of Proposed Data Collection Standards

Data metric	Proposed protocol
IRI for all Pavement Types ..	<ul style="list-style-type: none"> • IRI collection device in accordance with AASHTO Standard M328–14. • Collection of IRI data in accordance with AASHTO Standard R57–14.
Cracking_Percent for all Pavement Types (Except CRCP).	<ul style="list-style-type: none"> • Either manual cracking data collection and analysis in accordance with AASHTO Standard R55–10 (2013) or Automated Cracking Data Collection and Analysis in accordance with AASHTO Standard PP67–14 and AASHTO Standard PP68–14.
Cracking_Percent for CRCP	<ul style="list-style-type: none"> • Percentage of pavement surface with longitudinal cracking and/or punchouts, spalling or other visible defects (as described in the HPMS field manual). • Transverse cracking in CRCP is not included in the cracking computation.
Rutting for Asphalt Pavements.	<ul style="list-style-type: none"> • Either the 5-Point Collection of Rutting Data method in accordance with AASHTO Standard R48–10 (2003) or the Automated Transverse Profile Data method in accordance with AASHTO Standard PP69–14 and AASHTO Standard PP70–14.
Faulting for Jointed PCCP ...	<ul style="list-style-type: none"> • Measured pavement profiles using AASHTO Standard R36–13.

Table 2. Proposed Pavement Condition Rating Thresholds

Surface type	Metric	Metric range	Rating
All pavements	IRI	<95 95–170: Areas with a population less than 1,000,000. 95–220: Urbanized areas with a population of at least 1,000,000. >170: Areas with a population less than 1,000,000. >220: Urbanized areas with a population of at least 1,000,000.	Good. Fair. Poor.
Asphalt Pavement and Jointed Concrete Pavement.	Cracking_Percent	<5% 5–10% >10%	Good. Fair. Poor.
Asphalt Pavement	Rutting	<0.20 0.20–0.40 >0.40	Good. Fair. Poor.
Jointed Concrete Pavement	Faulting	<0.05 0.05–0.15 >0.15	Good. Fair. Poor.
CRCP	Cracking_Percent	<5% 5–10% >10%	Good. Fair. Poor.

Some good references:

MAP-21: <http://www.fhwa.dot.gov/map21/legislation.cfm>

HPMS field manual: https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/HPMS_2014.pdf

The Notice of Proposed Rulemaking “National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program and

Bridge Condition for the National Highway Performance Program” (and narrative which justifies it) can be viewed here: <http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30085.pdf>

<http://www.fhwa.dot.gov/policy/2013cpr/es.cfm>

For more information contact Steve Healow at: steve.healow@dot.gov



2015 RMWPPP Conference Held in Bozeman, Montana

By R. Gary Hicks, CP² Center

Over 80 people attended the Rocky Mountain West Pavement Preservation Partnership (RMWPPP) annual conference, October 19-21, 2015, in Bozeman, MT. The event was hosted by the Montana DOT and featured presentations and panel discussions on the following topics:

- Pavement performance measures and federal funding updates
- Status of specifications for preservation treatments being developed by the FHWA Emulsion Task Group
- Cost-effectiveness of preservation treatments

- Pavement recycling
- Data collection and reporting
- Concrete pavement preservation
- Crack sealing and filling
- Successful preservation programs for local agencies
- Proposed FHWA LTPP study on pavement preservation
- Innovations with RAP in preservation treatments
- Chip seal warrantees
- Certification and training
- Emulsion scrub seals

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Over 15 vendors participated in the event and interactions with this group were very valuable to the attendees. Dr. Gary Hicks of the CP² Center participated in the event and gave the presentation on the FHWA's LTPP experiment on pavement preservation. Robert Hogan of Caltrans gave a presentation on concrete pavement preservation practices in CA, while Sui Tan of the Bay Area's Metropolitan Transportation Commission (MTC) discussed the data collection and reporting practices used in their popular 'Street Saver' Pavement

Management System.

All of the presentations, a list of attendees and the full agenda can be found on the following website:

<https://tsp2pavement.pavementpreservation.org/rocky-mountain-west-rmwppp/annual-meetings/2015-2/>

The next meeting of the RMWPPP group, and the other regional partnerships, will occur at the National Conference on Pavement Preservation in Nashville, TN, in October, 2016.



CP² Center Patrons Program By Roger Smith, CP² Center

The CP² Center's "Patrons Program" gives our partners from industry and other pavement oriented groups a way to provide more "general" sustaining support for the Center, and to help direct and even participate in the Center's activities.

The California Pavement Preservation Center (CP²C) was established in 2006 at CSU, Chico, to provide assistance with the development and use of appropriate pavement preservation strategies. The Center was originally funded by Caltrans and continues to work closely with them, as well as other agencies. We maintain a very experienced staff of pavement experts, and a state-of-the-art laboratory facility.

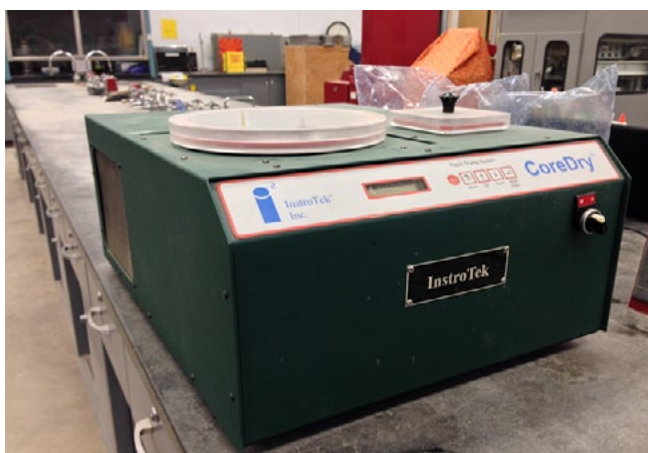


Figure 1. CoreDry machine Donated to the CP² Center by Contra Costa County

The Center is funded only by contracts with agencies such as Caltrans and Cal Recycle and other clients, and work under those contracts is narrowly defined, so that funding may only be used for specific contract tasks. The Center, therefore, has no contingency funding to sustain "overhead" activities, such as maintaining lab equipment, preparing contract proposals, organizing meetings and conferences, partici-

pation in events to promote pavement preservation, and delivering training classes. This funding must come from non-contract sources such as our Patrons Program.



Figure 2. Margie Valdez of Contra Costa County and Dr. Ding Cheng, CP² Center

In September 2015, the Center received the equipment donation from the department of public works of Contra Costa County. The Center and College of Engineering of Chico State University greatly appreciate the support from the Contra Costa County, especially Julia Bueren, director of the public works department.

For more information on joining our Patrons Program, please contact Co-Chairs, Dr. Gary Hicks at rg Hicks@csuchico.edu and/or Dr. Hans Ho at handsho@telfercompanies.com.

More information on the Program can also be found on the Center's website at www.cp2info.org/Center



Mark Your Calendar (Coming Events)

The new Caltrans **2015 Standard Specifications** are now posted online at: http://www.dot.ca.gov/hq/esc/oe/construction_standards.html. Classes by CalAPA on the revisions to Section 39, "Hot Mix Asphalt", are continuing, with the next sessions scheduled for January 6 and 7 in Hayward. For more information go to: www.calapa.net



National Pavement Expo 2016 focuses on commercial paving and pavement maintenance in addition to related issues such as pavement striping, snow removal contractor operations. (January 27-30, Charlotte, NC.) www.nationalpavementexpo.com

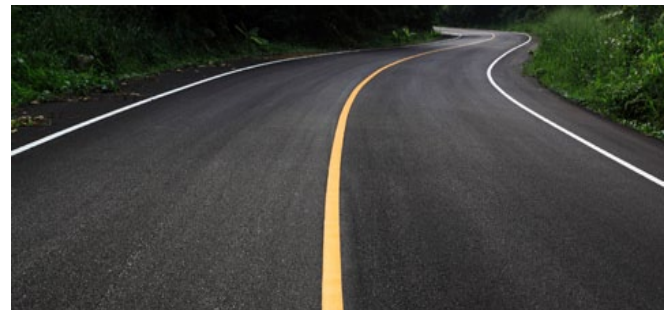
World of Concrete is the industry's only annual international event dedicated to the commercial concrete and masonry industries. (February 2-5, Las Vegas) www.worldofconcrete.com



Pavement Preservation Workshop 2016, presented by the California Chip Seal Association, will provide valuable information on all aspects of pavement maintenance with special focus on chip seals, slurry seals and other

popular surface treatments. (February 10-11, Sacramento) www.chipseal.org

Two new classes geared towards local agencies, will be offered by the Technology Transfer Center at U.C Berkeley. One on **Pavement Management Systems and Preservation Strategies** (IDM-28) will provide valuable insight pavement maintenance work and communicating funding needs to local officials. (March 2-3, Costa Mesa). Another new class, **Superpave Mix Design For Local Agencies** (IDM-27), will provide options for local agencies' use of the new asphalt mix design system adopted by Caltrans and other state DOT's (May 24-26, ONLINE). This online class involves 2-hour sessions on three days. For information on these and other related classes go to: <https://registration.techtransfer.berkeley.edu/wconnect/ShowSchedule.awp?&Mode=GROUP&Group=:FULL&Title=Complete+Listing>



World of Asphalt brings together the industry's leading manufacturers and service providers in the aggregate, asphalt, pavement maintenance, and traffic safety industry sectors to showcase their latest products and technologies. This big event partners with the AGG1 Aggregates Academy & Expo, which is the aggregate industry's leading exposition and educational resource. (March 22-24, Nashville, TN) www.worldofasphalt.com

Disclaimer: Caltrans does not endorse any industry products or services, and the contents of newsletter articles reflect the views of the authors and do not necessarily reflect the official views or policies of Caltrans, the CP² Center, or the State of California.

Caltrans established the California Pavement Preservation (CP² Center) at CSU, Chico in July 2006, and fully funded the Center in January 2007. Dr. DingXin Cheng is the current Director of the Center. Mr. Hector Romero is the current contract manager of Caltrans. The purpose of the Center is to provide pavement preservation support services to Caltrans and other public agencies, and to industry. Unique services include developing educational programs in pavement preservation, providing training and staff development opportunities, providing needed technical assistance to public agencies and industry, and managing/conducting research and outreach services, such as this newsletter. CP² Center News is published quarterly by the CP² Center, Langdon Hall Suite 203, California State University, Chico, Chico, CA 95929-0603. Subscriptions by e-mail: contact CP2C@csuchico.edu to add your name to the distribution list.