



# CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

No. 37

March 2016

## It's a WRAPP Workshop!

By Roger Smith, CP2 Center

The theme was "Looking Back To Move Forward" as the **Western Regional Association for Pavement Preservation (WRAPP)** celebrated its new name at their annual Pavement Preservation Workshop at the Holiday Inn, February 10-11 in Sacramento. Formerly the California Chip Seal Association, this well organized group has long been involved with much more than just chip sealing, so the new name is fitting.

WRAPP's new President for 2016, **Jason Lampley** of **Intermountain Slurry, Inc.**, welcomed the large turnout of over 275 attendees – mostly road and street managers from public agencies. Jason takes over the leadership from Katrina Lynch of Ingevity (formerly Mead Westvaco). Caltrans director **Malcolm Dougherty** gave the keynote speech at the Workshop.



Figure 1. Malcolm Daugherty, Caltrans Director, delivered the keynote address

The Workshop also involved vendor displays and slurry seal machines displayed outside. WRAPP's "Lifetime Achievement Awards" were presented to **Jim Ryan** of **Alon Asphalt** and **Mark Bertsch** of **American Pavement Systems**. We can't include all of the great information presented at the Workshop but here are some highlights.



Figure 2. From left to right, Scott Metcalf, Jim Ryan, Scott Dmytrow, Jason Lampley, Mark Bertch

**Sacramento** City Councilman, Steve Hansen, welcomed the group and gave an overview of Sacramento – including its historic significance and its current progressive approach to maintaining city streets. **Josh Werner**, with the City, gave an overview of the Sacramento's pavement preservation program, which includes cape seals (some rubberized), *Continued, next page*

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fiberized slurry seal, REAS, and Type 1 slurry seal for its 60 miles of bike trails. After enjoying a burst of federal “stimulus” funding, the city has settled down to a maintenance budget of \$4-5 million per year.

Keynote Speaker **Malcolm Dougherty**, reminded the group of the importance of pavements in California, in that they carry 10% of the total vehicle miles traveled in the U.S. and 40% of the shipping container movement. “Fix It First” is the continuing mantra of Caltrans, recognizing that funding is severely limited. Various proposals via the state legislature and the Governor aim to provide \$5-7 billion per year. In an effort to assess a vehicle miles traveled (VMT) fee for road users, a pilot program has begun and is seeking 7000 volunteers via the Caltrans website. Replacing the gas tax with an overall state sales tax has also been proposed.

A “lower altitude” Caltrans update was given by **Sri Balasubramanian**, who stressed that Caltrans is hoping for more funding than the roughly \$1 billion per year they’ve been receiving. He also noted that Federal Funding is now contingent on achieving performance measures for pavement condition - namely smoothness, rutting and cracking, and also faulting in concrete pavement. Their statewide pavement condition surveys reveal that 80% of their pavements are in the “fair” or “good” condition, with 16% “distressed”. They will strive to get that number below 10%. Caltrans is in the process of developing their 5-year Strategic Management Plan and would welcome outside input. He also welcomed participation in the Caltrans-Industry Rock Product Committee where input from local agencies is especially needed. He reminded people that the Caltrans 2015 Standard Specifications are now available, both online and in printed book form. Books can be ordered at: [www.dot.ca.gov/hq/dpac/publicat.htm](http://www.dot.ca.gov/hq/dpac/publicat.htm). Important to note is that the rewrite of Section 37 on “Sealcoats” was not done in time for the 2015 printing, so will soon be available as a Revised Standard Specification (RSS). Sri also addressed the specific concern that lane closures allowed for chip seal work are often too short, both in length and time duration. This restricts production and results in higher costs to Caltrans. They will be reviewing their policies and may make some changes to streamline chip seal production.

A “Pavement Preservation Roundtable” followed, which featured three perspectives from state and local agencies:

- **John Fox Caltrans, District 9.** Their severe climate, unpredictable weather and remote location present big challenges. They end up being reactive instead of proactive. They still have problems with thermal cracking - some amazingly large. Many strategies are used including fog seals, all types of chip seals (including over fabric), scrub seals and the use of polymer-modified asphalt binders (e.g. PG 64-28).
- **Jerry Dankbar, City of Roseville.** Their pavement preservation program has been able to maintain their arterial streets at an average PCI of 72 and residential streets at 65. Their program requires about \$7-8 M annually, but lately ADA requirements have been taking almost 20% of their available funding. Utility trenching and busses have had a great impact on their pavements, so they now assess an impact fee to these groups. Always progressive and open to new things, they are planning some pilot projects using roller-compacted concrete on a few residential streets. They closely track the cost of their many preservation treatments.
- **Jinghui Bradley, San Bernardino County.** Managing pavement in California’s largest county poses many problems, including many desert roads and 12 remote maintenance stations. They have a traveling in-house chip seal crew that covers the county, with prep work done by the crews from the local maintenance yards. Their pavement management system uses the ICON software for which they try to assess pavement condition every 2 years. For construction activities, they group roads together to minimize mobilization costs.

**Dr. Peter Sebaaly of University of Nevada, Reno** reported on research findings in two noteworthy areas. His findings are summarized briefly below:

1. Slurry Seal Optimum Timing – Slurry seals offer the most benefit if they’re placed when pavements are about 3-years old, and again at about 7 years.

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2. Cape Seal Benefits – Cape seals provide 5 years of service vs. 3 years for slurry seals. They have a higher first cost but are more cost beneficial in the longer run. Their work also validated the importance of doing crack sealing prior to the cape seal.

Several “breakout” sessions were also included in the overall program. Of special interest was one on chip seal inspection by **Joe Romer**, a veteran public works inspector who currently does work for the **City of Rocklin** and other local agencies through Regional Government Services. Joe stressed the importance of early planning, public notification of the work schedule, using clean chips, and slow rolling with rubber-tired rollers.

Another breakout session on slurry seal machine calibration was presented by **Doug Hogue of VSS**. Worth noting is that calibrations are quite involved and costly, so should not be required unless material sources have changed, or if the calibration is outdated – say more than several months old.



Figure 2. Cycling Enthusiast

**Bicyclists** concerned about rough chip seal surfaces were brought to light by **Julie Bueren**, Director of Public Works for **Contra Costa County**. As an avid bicyclist, she appreciates both the bicyclists concerns and a public agency’s need to apply pavement preservation treatments like chip seals.

Recent California legislation gives bicyclists an equal right to the road. This, coupled with the

“Complete Streets” concept, which strives for roadways (and pavements) that are friendly to non-vehicle traffic, such as bicyclers and pedestrians, has given rise to accommodating a more vocal bicycle community. In addition to



Figure 3. Hector Romero of Caltrans and Dr. Ding Cheng of the CP<sup>2</sup>Center at the Center Booth

smooth pavement, bicyclists also want better notification of lane closures and construction activities.

Other presentations at the Workshop included use of RAP in pavement surface treatments, slurry seal inspection, pavement preservation strategies of the **Texas DOT**, and an update on the pavement preservation test track at the National Center for Asphalt Technology (**NCAT**), which hopes to quantify the benefits of various surface treatments.

The Workshop concluded with their annual presentation of Contractor Quality Awards for outstanding projects. Winners are posted on the WRAPP website.

For more information, all presentations from the Workshop will be posted on the WRAPP website at: <http://wrapp.org/>

**PRESS RELEASE: (From Scott Dmytrow & Jason Lampley, President) MAR16**

The California Chip Seal Association is changing its’ name. The applications by the membership have grown since 1987 and now encompass almost all aspects of preservation and maintenance starting with fog seals and ending with recycling. As such the membership of the organization has decided it is time to update its name and logo. The new name is the Western Regional Association for Pavement Preservation. This helps the organization reflect its’ membership base which includes CA and NV members as well as the fact that many members work in AZ, OR and WA. The CCSA will still be in the background maintaining the history and legacy of the organization. The website will also be changing from [www.chipseal.org](http://www.chipseal.org) to [www.wrapp.org](http://www.wrapp.org). This change will be effective shortly.





## New 2015 Caltrans Standard Specifications Now Available

By Roger Smith, CP<sup>2</sup> Center

Caltrans has officially released its new 2015 Standard Specifications. As Caltrans rolls out its new 'Standard Specs', many eyes will be on Section 39, "Hot Mix Asphalt", a highly revised element. The new Section 39 is Caltrans' vehicle for officially transitioning to the national "Superpave" criteria for asphalt binders and hot mix asphalt (HMA) mixes. To help smooth the way for the many new requirements in Section 39, the California Asphalt Pavement Association (CalAPA) has been holding half-day classes led by Paul Curren, formerly of Pavement Engineering Inc. These classes do a great job of addressing and clarifying the many new items including:

- Material requirements (asphalt binder and aggregates, antistrip additives, WMA)
- RAP Use and Handling
- Mix Design (Gyratory Compactor and Hamburg Wheel Tracker; no more Hveem stability)
- Contractor QC Plan & Testing
- Material Sampling and Testing
- HMA Paving & Rolling



Figure 1. Hot Mix Asphalt Placement

- Caltrans QA Acceptance criteria (density acceptance via cores (not nuclear gauge); smoothness measured via Interior Profiler (not the Profileograph))

Because of the many changes in Section 39, Local Agencies should approach it cautiously and know the ramifications of simply saying, 'Pave it according to Caltrans Section 39'.

Most agencies simply want to use HMA specs that have served them well historically (e.g. Caltrans Type B HMA). Unfortunately, these mixes are no longer on the Caltrans menu. But efforts are underway by a special task force to develop a simpler HMA spec appropriate for lower volume roads. This "HMA-LV" spec would be less stringent - especially in the area of

material requirements and QC and QA testing requirements.

Information on CalAPA classes can be found at: [www.calapa.net](http://www.calapa.net)

The 2105 Standard Specifications can be viewed at: [http://www.dot.ca.gov/hq/esc/oe/construction\\_contract\\_standards/std\\_specs/2015\\_StdSpecs/2015\\_StdSpecs.pdf](http://www.dot.ca.gov/hq/esc/oe/construction_contract_standards/std_specs/2015_StdSpecs/2015_StdSpecs.pdf)

To purchase a printed copy of the Specifications go to: <http://www.dot.ca.gov/hq/dpac/publicat.htm>



## Rocklin Installs High Density Mineral Bond

By Joe Romer, RGS Inspector for City of Rocklin

The City of Rocklin, always open to new products to maintain city streets and different strategies for pavement maintenance, applied High Density Mineral Bond (HDMB) treatment to residential streets this past summer. Richard Lawrence, Public Works Supervisor, became interested in HDMB after a webinar session on pavement maintenance products and applications. The City of Rocklin is no stranger to pavement maintenance projects. Slurry seal, crack sealing, micro surfacing and cape seals have been regular components of the city's maintenance programs.

According to Mark Beatty, Senior Vice President at IPS / Holbrook Asphalt, "The City of Rocklin, was the first California agency to



Figure 1. HDMB Surfacing

apply a new classification in pavement preservation known as a High Density Mineral Bond. With a 14-year performance history in other

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states, the product minimized any agency risk commonly associated with a first-time project. The surfacing couples a preservation treatment with a track record of performance with high aesthetics that residents embrace.”

HDMB has triggered intense interest and use nationally based solely upon its performance record. HDMB is a proprietary product of emulsion, polymer additives and very fine aggregates.



**Figure 2. Spray Application of HDMB**

It is spray-applied, similar to some seal coats, in a two application process. Rocklin’s research verified the performance history of HDMB. Over 200 million square feet have been installed throughout the U.S. The history of the product dates back to pilot installations in 2002.

It is a preservation treatment intended to keep good pavements in good condition by minimizing oxidative damage from moisture and from UV rays.

“Even though the application was new to California, we were anxious to get it on the ground because it had over a decade of proven performance,” stated Rocklin’s Richard Lawrence.

As Tregg Holbrook, founder and CEO of IPS / Holbrook Asphalt, puts it, “As we advised community leaders managing pavement assets, we

**Figure 3. Valve Covers Masked Before Spray Application of HDMB**



would steer decision makers to treatments with a known level of functioning, such as slurry, micro surfacing, or chip seals. The feedback from residents was that they were often displeased with these types of surface treatments after they were installed. Suggesting that agencies use pavement sealers that are considered to have better aesthetics, such as fog seals or parking lot emulsion sealers, which both turn roads black and are believed to look good post-installation, was always an option, but the performance longevity was recognized as a considerable weakness.”

As the inspector on this project, and hearing of this product for the first time, there were many questions to be answered. For example; What is it? How is the product applied? How do you measure the application rate? What is the product supposed to look like after application?

After the first day of application, these questions were quickly answered. The “HA-5” HDMB product was installed by Holbrook Asphalt in July, 2015, working as subcontractor to Sierra Nevada Construction. Dipping the



**Figure 4. "Cutting in the Gutters" by hand wand and shield**

tank on the spreader truck before and after solved the application rate question. The HDMB left the roads a deep black color. This product is applied in two applications per street, requiring a 24-hour closure for the applications to fully cure. Each application consisted of one spreader truck “cutting in the gutters” by hand wand and shield, and the second spreader truck spraying the streets with the spray bar. This procedure was repeated a second time, after the first application had time to break. The average total application rate was 0.35 gallons per square yard. Street closures were planned such that residents were able to

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park a short distance from their homes. Phone calls were minimal after the residents were able to see the finished product.



Figure 5. Spraying the Streets with the Spray Bar

There were many lessons learned from this project. Interestingly, it was found that after the HDMB was installed, surface temperatures, anticipated to be higher due to the darker color alone, were actually 5 to 10 degrees cooler as compared to adjacent pavements that either had no previous treatment or that had a micro or slurry installed years earlier.

The project installation was a success overall, and the City of Rocklin will be monitoring its performance. It will continue to be an instrument within the City of Rocklin's toolbox.

For more information contact Joe Romer, RGS Inspector for City of Rocklin, at: [romer@att.net](mailto:romer@att.net)



## Asphalt "User-Producer" Group Update

By Roger Smith, CP<sup>2</sup> Center

The various committees of the Pacific Coast Conference on Asphalt Specifications (PCCAS) met at the University of Nevada, Reno (UNR) on October 20 & 21, 2015. The PCCAS (aka. User-Producer Group) is a long-standing forum for state DOTs to meet with asphalt suppliers, in the interest of developing the best specifications for asphalt products. Representatives from California, Nevada, Oregon, Washington, Alaska and Hawaii participate in PCCAS, making a valuable forum for exchanging technical information on asphalt. The CP<sup>2</sup> Center is an Associate Member because of our state-of-the-art lab facilities. Here's an overview of the various activities of the committees.

**The Paving Asphalt Committee** has been evaluating tests for asphalt binders that correlate with field performance, developing better tests for rubberized asphalts, and generally monitoring the practices of state DOTs, the primary users and specifiers of asphalt products. The Committee has two active Task Forces described below:

- **MSCR Task Force** – The Multiple Stress Creep Recovery (MSCR) test is a new test (AASHTO T350) for asphalt binder's high-temp properties using the DSR test machine. This data was collected for various asphalts produced in the 2015 paving season. The variability of the test results appears to be higher than anticipated, but the test has been correlated to the pavement rutting, and is a better test for polymer-modified asphalt binders. State DOTs and asphalt suppliers prefer a 'go slow'

position and want to wait for further review of the national studies. At present, Washington is the only state DOT planning to implement the MSCR test – in April 2016. The Nevada DOT is requiring the new test be run on all projects, but for information only.

- **Rubberized Asphalt Task Force** – Agencies throughout California, via Caltrans' lead, continue to make us a leading state in asphalt rubber use. Caltrans now mandates it in virtually all surface courses. PCCAS work is continuing on using the 'PG' grading methods for rubberized asphalt binders, and using the DSR device for testing asphalt rubber binders containing coarser crumb rubber (e.g. the California type). A new test method using the plate-to-plate DSR with a larger (3mm) gap has been developed and round-robins have been completed, with 15 labs participating. The precision of this test method looks good, although there are some problems with conventional oven-aging of the specimens prior to testing.

**The Emulsion Committee** is 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 in order to evaporate the water may be altering the properties of the asphalt residue, especially polymer (latex) additives typically in chip seal emulsions (e.g. PMCRS-2). A gentler method involving realistic field temperatures is being sought. Ultimately, this

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group hopes to use the 'PG' grading system to characterize the asphalt in emulsions. Various methods for doing this are being looked at nationwide. A laboratory correlation program (aka. 'round robin') for emulsion testing is another goal of the Committee, and it appears that PCCAS members will be able to participate in the correlation testing program currently run by the Oregon DOT.

**The Recycling Committee** has been focusing primarily on the use of reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS) in plant-produced hot mixes, and on cold in-place recycling (CIR) performance. A report on the 2-year performance of CIR projects will be available on the PCCAS website. Most state DOTs now allow both RAP and RAS in their HMA. Some states allow a maximum amount of "binder replacement" due to the combined effects on RAP & RAS. Caltrans allows up to 40% RAP in lower lifts and 25% RAP in surface

lifts, where total binder replacement may not exceed 25%. Washington DOT allows a maximum of 40% binder replacement, and currently doesn't allow RAP or RAS in WMA. 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%. There is growing concern nationwide about early cracking in HMA pavements with high percentages of RAP and RAS. This will be the focus of a lot of future studies.

A full PCCAS Conference is planned for May of 2016 in Seattle, wherein these Committees will officially report on their efforts and consider future directions. These Committees will meet again October 25-26, 2016, at UNR in Reno.

For more information on PCCAS, including meeting minutes and reports go to [www.pccas.org](http://www.pccas.org).



## Concrete Pavement Spall Repair

By Doran Glauz, Caltrans

Caltrans has developed new standard details for spall repairs in concrete pavement. The significant change in the spall repair practice is to chip a sloped surface outside the saw cut rather than stopping concrete removal at the saw cut. This provides a larger, rougher surface area for the patching material to bond to, and there is no smooth, vertical plane for the patching material to pull away from during finishing or curing. Also, the run-out area of the saw cut is removed, so there is no residual stress concentrator.



Figure 1. Spall Repair Preparation: Saw Cut Rectangular Area, Remove Concrete Inside Area to Minimum Depth, Chip Sloped Surface Outside Saw Cut. Photo Shows Two and One Half Sides Completed.

The spall repair detail is based on work published by the National Concrete Pavement Technology Center (*CP Tech Center*), in their "*Guide for Partial-Depth Repair of Concrete Pavements*". The current standard plan for spall repair is "*2015 Revised Standard Plan RSP P6*" dated October 30, 2015. It shows details for spall repair at joints and at mid-panel.

Constructing a spall repair is a cooperative and iterative process between the contractor and the Engineer. There are multiple steps to ensure that the spall repair is in the correct place, is the proper size, and the contractor is paid appropriately. The steps are:

1. Engineer identifies spall repair location and determines limits of delaminated area
2. Contractor marks proposed saw cut lines
3. Engineer authorizes the saw cut lines and measures sawing dimensions
4. Contractor removes concrete and places patch material

Spall repair locations may be shown on the plans, however the plans cannot be precise about the extent of the delamination around the visible spall. Often the visible spall is only the limited surface manifestation of a much larger subsurface delamination or horizontal fracture plane.

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If the delaminated area is left to remain, a larger spall will appear in the future. Delaminated area is determined by sounding, i.e., pounding the pavement with a metal object, typically a hammer. When hitting sound concrete, the hammer bounces well and the sound emitted is a distinct ping. When hitting delaminated concrete the hammer bounces less and the sound emitted is hollow. Sand and dirt on the surface will dance over the delamination and not over sound concrete that is struck. The edges or extent of the delamination should be marked.

The saw cut lines must form an approximately rectangular area. The detail shows that each corner must be  $90 \pm 10$  degrees. A skewed joint is approximately ten degrees from perpendicular. Each of the saw cut lines must be at least 2 inches from the delamination and at least 8 inches away from the nearest approximately parallel joint or crack. If a saw cut is too close to a nearby joint or crack, extend the spall repair area to that joint. Alternatively, in some cases the orientation of the saw cut can be changed so that it is not too close to the joint.

The Engineer authorizes the saw cut lines upon verification that the contractor's layout conforms to the specification requirements. This is the time to measure the spall repair for pay purposes since after the concrete is removed, there is no way to know where the authorized area was. Measuring to the nearest inch or tenth of a foot is accurate enough. Calculate the area to the nearest 0.01 SY and pay a minimum of 0.10 SY for any one spall repair area. It is a good idea to mark a spall repair area to show that it has been verified and measured.

Concrete removal begins with sawing on the previously laid out and authorized lines. The concrete inside the lines is removed to the required depth with small pneumatic or hydraulic chipping hammers with a chisel tip. The area of delamination will remove relatively easily, while the sound areas outside the delaminated area will be

more difficult to remove. This can provide confirmation that the area of removal was laid out properly. The final step of removal is to chip around the edges to remove the sawn surface and provide a rough sloped surface with irregular edges. Further preparation of the repair is made by removing all the debris from the repair area. If the spall repair is adjacent to or crosses a joint or crack, compression relief



**Figure 2. Completed Spall Repair. Note Longitudinal Joint is Formed. In This Example the Transverse Joint is Not Formed, but Should Be.**

form board must be inserted into the joint or crack. The form board prevents the patch material from bridging over or flowing into the working joint. A bridged joint will soon force the spall repair to fail. As an alternate to forming a joint that a spall repair spans over, the joint can be caulked to prevent repair material from entering it and then the repair material can be sawn completely through shortly after hardening.

Finally, the patching material is placed in the fully prepared area. Preparation may include a bonding agent, depending on the repair material used. Polyester concrete with high molecular weight methacrylate bonding agent is the current material of choice to provide superior bonding, with increased tensile strength and a lower modulus of elasticity than portland cement concrete.

For more information go to: [http://www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement\\_Engineering/CPG/CPG\\_Ch310\\_Spall\\_Repair.pdf](http://www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement_Engineering/CPG/CPG_Ch310_Spall_Repair.pdf) or contact Caltrans' Doran Glauz at: [doran.glauz@dot.ca.gov](mailto:doran.glauz@dot.ca.gov)



## Caltrans Bridge Deck Treatments

By Roger Smith, CP<sup>2</sup> Center

Bridge decks are a vital part of our pavement system. Unlike most of the concrete pavement in California, bridge decks, being part of a structure, contain steel reinforcement. With time and traffic loading small cracks in these decks that can allow water to enter reach rebar and cause corrosion. With time, corrosive action can lead to further deterioration of the concrete deck. This process is accelerated in snow areas where roads are 'salted'. Any surface seal used on these decks must also offer good skid resistance since bridge decks tend to be icy.

Caltrans has been using a Multilayer Polymer Overlay via their Standard Specification 15-5.01. They also use a High Molecular Weight Methacrylate primer, which is placed in the same shift prior to the overlay material. The primer heals the existing cracks in the bridge and also increases the bonding strength of the material. There are several type / brands available. The dual purpose of the overlay was for waterproofing and skid resistance.

For recent work on bridge decks on Business I-80 in Sacramento, Kwik Bond PPC-MLS Polyester Multilayer System, from Kwik Bond Polymers, was used. The Kwik Bond product is a mixture of PPC MLS Binder (polyester) resin mixed with their MEKP-DDM9 (catalyst). These two materials were mixed by hand (this can be done with an automated truck if the contractor has one) and spread uniformly on the bridge deck using notched squeegees. After the material was spread the graded aggregate was placed over all the evenly spread resin, and the excess picked up.

All the work was done at night with most lane closures from 9 p.m. to 6 a.m. northbound and 9 p.m. to 5 a.m. southbound. The



Figure 1. Completed Bridge Deck Treatment

application involved 2 layers being placed on the whole bridge. Production rates varied anywhere from 23,000 to 36,000 square feet per night. The bridge area was 160,000 square feet of two layers - one layer one night covered by the second layer the following night. So ultimately there was approximately 330,000 square feet of area to be covered by the material.

The process cannot be placed on a wet surface. Caltrans controls this by restricting the relative humidity to less than 85%. There are also temperature restrictions depending on the resin binder type. The cure rate of epoxies is significantly affected by temperature. Epoxy based



Figure 2. Close-up of New Overlay Texture

overlays generally are not placed if the deck temperature is less than 65°F. Polyester and methyl methacrylate based overlays can be placed down to 45°F and still achieve a reasonable cure rate. Conversely, an excessively high deck temperature may cause the resin to flash set before the aggregate is applied. Caltrans restricts the maximum deck temperature to 100°F. The Sacramento overlay was placed in July of 2015.

The contractor was West Coast Structures, Inc. (DBA Western Structures), and the material supplier was Kwik Bond Polymers. The Caltrans Resident Engineer was Sushma Lee and the Office of Structures Representative was Joshua Burke.

Caltrans' first application of multilayer polymer overlays (or the old term polymer chip seal) was in 1996. Caltrans now uses polyester concrete as its primary material for bridge deck overlays. These overlays are also used by other states.

The following Caltrans people contributed to this story: Michael J. Lee, Ken Hallis and Joshua Burke.

For more information contact: (916) 657-5060  
Caltrans Public Affairs - Jason Probst



## “Caltrans Concrete Pavement Guide” Now Available

By Roger Smith, CP<sup>2</sup> Center

The new Caltrans Concrete Pavement Guide (CPG) provides a comprehensive overview of current new construction / reconstruction, preservation, and rehabilitation strategies used by Caltrans for concrete pavement. The information in the CPG applies to all concrete pavement and composite pavement that was not previously cracked-and-sealed. Some of these topics were previously addressed in the Maintenance Technical Advisory Guide (MTAG). The CPG reflects updated Caltrans practices, including effectiveness and limitations of PCC pavement, strategy and materials selection, design issues, and implementation of the revised 2010 construction contract standard plans, specifications, and bid items for individual pavement strategies. The CPG assists their District design, maintenance, and materials personnel with concrete pavement project

delivery by supplementing information and design standards contained in [Highway Design Manual \(HDM\) Chapters 600-670](#).

The Caltrans [Construction Manual](#) should be referenced for more comprehensive information about specific construction procedures, but some relevant concrete pavement construction information is included in the CPG.

The [Concrete Pavement Guide](#) is divided into 19 topical chapters organized into 4 parts: Part 1 provides general information and an overview of concrete pavement strategies and evaluation; Part 2 covers new concrete pavement and reconstruction strategies; Part 3 preservation strategies; and Part 4 rehabilitation strategies.

For more information contact Robert Hogan of Caltrans at: [robert.hogan@dot.ca.gov](mailto:robert.hogan@dot.ca.gov)



## City of L.A. BSS Wins 2015 Sorenson Award

By Jim Moulthrop, Foundation For Pavement Preservation (FP<sup>2</sup>)

The City of Los Angeles Bureau of Street Services (BSS) is the winner of FP<sup>2</sup>'s *James B. Sorenson Award for Excellence in Pavement Preservation* for 2015. Under the leadership of Nazario Saucedo, Director of the Bureau of Street Services, Department of Public Works, the 40-year decline in city-wide road quality

was arrested via aggressive pavement management and preservation.

Last year, the Bureau of Street Services completed the largest annual pavement preservation program in the history of Los Angeles, with a total of 2,400 lane-miles of pavement preservation completed during the FY 2014-15, the distance between Los Angeles and New York City.

"We made it happen by working incessantly -- days, nights, weekends, and holidays -- while embracing the principles of efficiency, innovation, performance stats, and intradepartmental collaboration," Saucedo said.

The Bureau of Street Services gained support for its pavement preservation program by providing quantifiable data to elected officials while educating citizens. Today, the Bureau conducts extensive community outreach to stakeholders through social media, a Bureau website, notification mailers, and attendance at neighborhood council meetings. The city's and Bureau's websites offer the public ongoing performance metrics, information on roadwork in progress, a list of monthly committed scheduled projects, and pavement condition assessments.

Maintaining the integrity of city roads pays off

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Left to right: Jim Moulthrop, FP<sup>2</sup>; Keith Mozee, Division manager, BSS; Barbara Romero, Deputy Mayor for City Services; Nazario Saucedo, Director, BSS; and Kevin Jones, President, Department of public works (photo by, City of L.A.)

over time, as each dollar spent on maintaining roads in good to fair condition diminishes the need to spend four to five dollars on rehabilitating or reconstructing a road in very poor condition.

Additionally, the Bureau maximizes savings by resurfacing streets in grids. A pavement preservation grid strategy allows consolidation of resources and creates efficiencies that enable the Bureau to resurface more streets in the network.

Future maintenance costs are significantly reduced, as these grids can be maintained with additional slurry seal applications up to 21 years on the 40,242 street segments (residential neighborhoods) with low traffic volume. The Bureau's expectation is that fewer residential streets will need to be resurfaced in future years due to this increased level of preventive maintenance.

In 2009 the Bureau completed 1,833 lane-miles of pavement preservation, getting close to the 2,000 lane-miles needed to stabilize and prevent the network's pavement condition in-

dex (PCI) dropping below 62.

From 2012 through 2015 the Bureau completed the three largest annual pavement preservation programs in the city's history. This culminated in completion of an all-time record of 2,400 lane-miles of pavement preservation consisting of 855 lane-miles of resurfacing and 1,545 lane-miles of slurry seal.

L.A.'s public/private partnership in the use of rubberized emulsion aggregate slurry (REAS) has proven to be an excellent part of the Bureau's plan. The result has extended the life of streets that are in good condition, applying on average 1,300 lane-miles of slurry per year. In the same time frame the annual resurfacing program of 800 to 900 lane-miles per year focused on thin lift overlays and rehabilitating streets.

Deadline for entries to the 2016 Sorenson Award is July 1. For more information, or to submit nominations, please contact FP2's executive director, Jim Moulthrop, at 8100 West Court, Austin, Tex., 78759, voice (512) 970-8865, e-mail at [jimmoulthrop@gmail.com](mailto:jimmoulthrop@gmail.com).



## Citizen Involvement In Pavement Management

By Roger Smith, CP<sup>2</sup> Center

Although pavement management has become a highly technical 'science', which can involve complex software and specialized field surveys and equipment, some California communities are seeing the value in adding some good ol' citizen input to the process. The formation of citizen advisory groups has worked well in several municipalities, especially smaller ones with tight-knit sense of community involvement.



One such city is **Orinda**. This smaller, quaint community (pop 17,600) is in the East Bay Area in Contra Costa County, just over the hill from Oakland and Berkeley. They incorporated in 1985 and inherited 92 miles of roads from the County, many in need of repair or preventive maintenance. As Orinda worked

to develop a pavement management plan via the Metropolitan Transportation Commission's (MTC) "StreetSaver" program, they realized they would need all the help and funding they could get.

The City's Measure L and J Programs are fund-

ed each year through a combination of 0.5% Sales Tax (Measure L) and a \$20 million bond (Measure J). The scope of work for these programs consists of repairing/reconstructing the worst, most used residential streets and the associated drainage pipes.

In an effort to involve city residents, the City formed the "Citizens' Infrastructure Oversight Commission" (CIOC) in 2004 to recommend policy and provide overall direction and oversight for the Pavement Management Program. The CIOC is an advisory body to the City Council on matters relating not only to the City's streets, but also storm drains and bridges. The Commission is made up of 7 citizens appointed by the City Council. They meet monthly.

The CIOC laid out several scenarios for road work, and the Council approved the option that would achieve a "good" status – a minimum PCI of 50 - for all roads (not the overall average), recognizing that many residential streets had a "Poor" or "Very Poor" condition rating.

According to Charles Swanson, Orinda's  
*Continued, next page*

Director of Public Works, "The City sees this plan as a way to bring the City's roads to a maintainable level going forward and a way to gain public support by fixing the roads that need to be repaired the most."

While a Pavement Management Program provides a long-term plan, potholes need faster response. Through their popular "Report-A-Pothole" program, Orinda citizens can report a pothole to the Public Works Dept., who will assess the pothole and schedule a repair, if warranted. Depending upon the size of the pothole and general condition of the road, the repair will be made within approximately one week or added to a list that will be repaired as part of a larger contract.

The **Town of Moraga**, a neighbor to Orinda, also makes use of a citizens group in the form of their "Local Sales Tax Oversight Committee", which watchdogs and reports on the use of funds from the "Measure K" sales tax increase, which was approved in 2012 by a whopping 70% of the voters. The 7-person Committee, appointed by the Town Council, is charged with the annually reviewing and reporting to

the Town Council on the revenue and expenditures related to the Local Sales Tax. It is not within the purview of the committee to direct staff, recommend any particular contracts, or define the scope of a road repair project. These responsibilities remain under the authority of the Town Manager, Town Council, and professional staff.

Regarding these local efforts, Sui Tan of the Metropolitan Transportation Commission (MTC) says, "These communities are examples of local initiatives that promote accountability, transparency, and performance. The MTC's "StreetSaver" pavement management program provided credible and defensible data, so both communities were able to pass local sales tax measures because they were able to quantify their maintenance needs, setup performance targets, and have a solid work plan based on "Street Saver's" recommendations. Citizen involvement has been a valuable resource in carrying out their programs."

More information on these programs is available on the websites of the city of Orinda and the town of Moraga.



## Rubberized Asphalt and Asphalt Rubber Conference

By George Way, Conference Co-Chair

The Rubberized Asphalt and Asphalt Rubber (RAR 2015) Conference, chaired by Dr. Jorge Sousa and co-chaired by George Way, was held in Las Vegas, Nevada, October 5-7, 2015, at the Luxor hotel. The conference focused on the beneficial use of recycled tire rubber in asphalt pavements. Introductory speakers included Bill Hoffman, Deputy Director Nevada Department of Transportation and Michael Dunning, Clark County Nevada Engineer, both spoke about the use of recycled tire rubber in Nevada.



Figure 1. Logo for The 2015 RAR Conference

The keynote speaker was Dr. Kevin Trenberth, a Distinguished Senior Scientist in the Climate Analysis Section at the National Center for Atmospheric Research in Colorado. He serves on the Intergovernmental Panel on Climate Change (IPCC) and shared the 2007 Nobel Peace Prize on this subject. His presentation entitled "Manmade Weather Changes, The Evidence" documented climate change and endorsed the use of recycled tire rubber in asphalt pavements as one means to help address the reduction in carbon emissions (CO<sub>2</sub>).

This was the sixth RAR conference. The previous five conferences included Portugal (AR2000), Brazil (AR2003), California (AR2006), China (AR2009) and Germany (AR2012). The RAR2015 Conference had many sponsors including Consulpav, RARX Enhanced Elastomeric Asphalt Extender, D&H Equipment, LTD; DER-RJ, the Rio de Janeiro, Brazil Province DOT; CEI Enterprises, Granutech Saturn, Recingila, LDA from Brazil; Dynatest, Land Pac from China; Cactus Asphalt, American Pavement Systems, Inc.; Rubber Pavements Association, Rubberized Asphalt Foundation, International Road Federation and Arizona State University.

*Continued, next page*

For the first time the Conference accepted papers about both rubberized asphalt and asphalt rubber, making it a full and comprehensive forum to present and learn from the new expanding frontier of asphalt binders and mixes that incorporate recycled tire rubber via various processes.

The 165 registrants heard presentations from authors representing many states including Arizona, California, Texas, Louisiana, Nevada, Florida, Michigan and Wisconsin. Leros Lane represented the CP2 Center. There were presentations from many countries as well, including Portugal, China, Sweden, South Africa, Brazil, India, Indonesia, Czech Republic, United Kingdom, Canada, Italy, Spain, Germany, Poland and Israel. Besides being treated to 50 technical paper presentations, registrants also enjoyed the opportunities to meet the present-

ers and sponsors at the ice breaker, breaks, lunch and a gala Brazilian food dinner.

The next Rubberized Asphalt Rubber conference will be held in 2018 (RAR2018) and is presently planned to be at a game preserve hotel complex in South Africa. Copies of the papers presented at the RAR2015 conference, as well as all the previous conferences (a total of over 300 papers), are available at: [www.consulpav.com/shop](http://www.consulpav.com/shop). There is a small fee for each paper and this money goes to the non-profit Rubberized Asphalt Foundation to support research, technology transfer, education and training for the beneficial use of recycled tire rubber in asphalt. In addition there are a few RAR2015 books available for \$75.

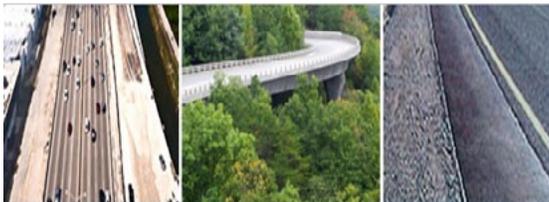
For more details contact George Way at [wayouta@cox.net](mailto:wayouta@cox.net).



## FHWA Update

By Steve Healow, FHWA Sacramento

Since our previous column we have in effect a new surface transportation law. On Friday Dec. 4 the **FAST Act** was signed into law. It's the first long-term surface transportation law since 2005. It will provide five years of funding certainty for infrastructure planning and investment. The Act will run through 2020 and includes \$70 Billion in transfers to the highway trust fund (HTF) to keep it solvent.



### FAST Act signed

Fixing America's Surface Transportation Act.

The Act includes \$226 Billion for FY 2016-2020 for highways, and \$79 Billion for other modes (e.g. transit and rail). In a related story from the "AASHTO

Journal" (2-5-16), the Congressional Budget Office (CBO) estimates the HTF will arrive at zero balance by 2021 and be \$76 Billion in arrears by 2026, although by law the trust fund cannot run a deficit. Put another way, the CBO forecast means that unless Congress acts to replenish the HTF before the account runs empty, then Congress will likely impose preemptive spending restrictions on state DOTs and transit agencies to prevent the HTF balances from falling below safe cash management levels. AASHTO President Bud Wright: "Perhaps the FAST Act's major weakness is that it did not lock in sufficient revenues for the Highway Trust Fund beyond a few years. It kicks the

funding question farther down the road, but as the CBO shows it is no lasting solution to our investment needs..."

The **Strategic Highway Research Project, Part 2 (SHRP2)**, a cooperative effort between AASHTO and FHWA, was established to promote strategies and technology which enhance productivity, boost efficiency and improve reliability on highways. SHRP2 recently launched Round 7 of their Implementation Assistance Program. For agencies which own and maintain pavements, here are a few initiatives in the spotlight:

1. "Precast Concrete Pavement for Rapid Repair" (R05) If you're considering precast concrete pavement as an alternative to cast-in-place look at R05 for guidelines and model specifications to help decide if precast slabs are a viable strategy.
2. "Pavement Renewal Solutions" (R23) includes – "rePave", the interactive, web-based pavement scoping tool. In using this tool Washington State DOT (WSDOT) was successful at saving time and money on an I-5 pavement rehab in Washington state, where they cut construction costs 20% and reduced construction-related lane closures by 43%.
3. "Guidelines for the Preservation of High Traffic Volume Roadways" (R26) is a tool intended to help identify viable pavement preservation treatments which will extend service life without major reconstruction and/or traffic disruption. [Continued, next page](#)

You can read more about SHRP2 Implementation Assistance Program by attending Round 7 webinars. For more information go to; [http://www.fhwa.dot.gov/goshrp2/Content/Documents/webinars/shrp\\_rd7\\_2016\\_webinar\\_flyer.pdf](http://www.fhwa.dot.gov/goshrp2/Content/Documents/webinars/shrp_rd7_2016_webinar_flyer.pdf)

How would you like to have access to over three decades of pavement performance data for over 2,500 test sections across North America, including scores of sections in California? Well now you do have access. The Long-Term Pavement Program (LTPP) has been accumulating condition and performance data on a variety of flexible and rigid pavements since 1989. The purpose of the 18 LTPP experiments was to determine the effect of loading, environment, material properties and variability, construction quality and maintenance levels on pavement distress and performance. Now their interactive LTPP database is available at: [www.infopave.fhwa.dot.gov](http://www.infopave.fhwa.dot.gov), or just search for "LTPP Infopave".

There are two new publications from the National Asphalt Pavement Association (NAPA)



regarding Reclaimed Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS) and the price is right. See more information at the NAPA web

page: [http://www.asphaltpavement.org/index.php?option=com\\_content&view=article&id=1085:napa-guides-help-increase-utilization-of-reclaimed-asphalt&catid=24&Itemid=767](http://www.asphaltpavement.org/index.php?option=com_content&view=article&id=1085:napa-guides-help-increase-utilization-of-reclaimed-asphalt&catid=24&Itemid=767)

References used in the article can be found at:

- <http://www.fhwa.dot.gov/fastact/presentations.cfm>
- <http://www.citylab.com/politics/2015/12/highway-bill-fast-act-cities/418788/>
- <http://www.aashtojournal.org/Pages/020516cbo.aspx>
- [https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/50150-Federal\\_Highway\\_Spending.pdf](https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/50150-Federal_Highway_Spending.pdf)

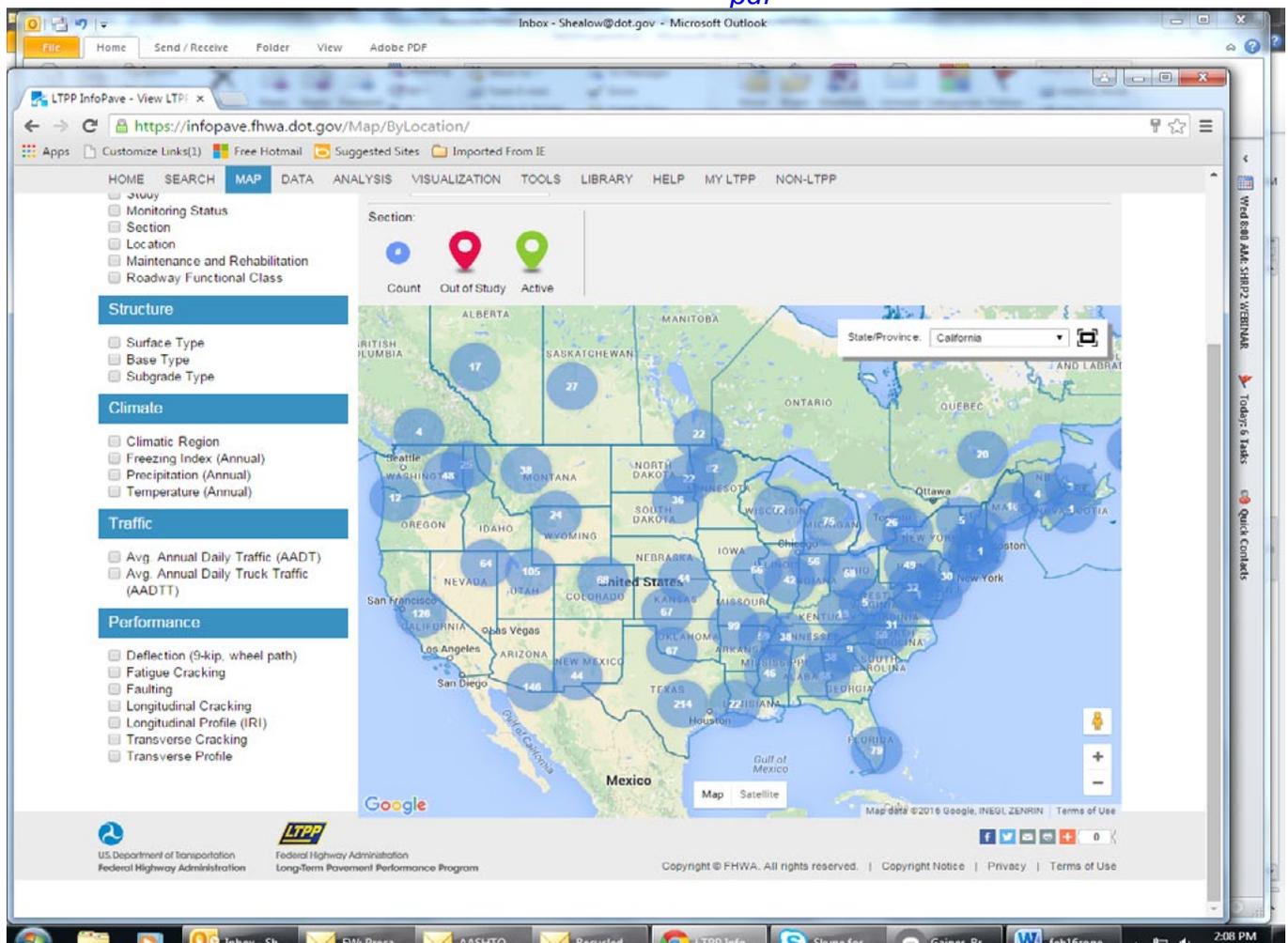


Figure 1. LTPP "Infopave" Online Database





## CP<sup>2</sup> Center to Celebrate 10<sup>th</sup> Anniversary

By Dr. Gary Hicks, CP<sup>2</sup> Center

My how time flies when you are having fun! In July 2006, Caltrans established the CP<sup>2</sup> Center at CSU, Chico. Thomas Ferrara was the first Director with Gary Hicks serving as the Technical Director. Shakir Shatnawi, the Pavement Engineer for Caltrans at the time, led the effort to set up the Center. Some of the early accomplishments for Caltrans were as follows;

- Development of the Maintenance Technical Advisory Guides for both flexible and rigid pavements. These can be found on the Center website. These were first developed in 2003 and later updated in 2007. Training materials for these publications were also developed in cooperation with industry. This training was delivered at several locations around the state.
- Working with Caltrans on a number of innovations including pavement recycling, chip seals, slurry seals, and warm mix HMA.
- Working with Caltrans and UC Berkeley on the annual Pavement Preservation Conferences, which culminated with the First International Conference on Pavement Preservation held in Newport Beach in 2010.



- Building a complete laboratory for testing of asphalt binders and mixes via the latest Superpave technology.
- Starting a quarterly Newsletter that now reaches over 5000 subscribers.



Since the formation of the Center, other clients, beyond Caltrans, have been added under the direction of past Directors, Gary Hicks and Mary Stroup-Gardiner, as well as the current Director, Ding Cheng. Some of the added clients have included;

- CalRecycle, (formerly the California Integrated Waste Management Board)
- Metropolitan Transportation Commission, Oakland California
- Federal Highway Administration
- National Cooperative Highway Research Board (NCHRP)
- Local Agencies
- Industry, including some of our Patrons

We are planning a celebration to mark our 10th Anniversary sometime in July, in Chico. We will keep you posted on the date. Please check out our website for more information: <http://www.csuchico.edu/cp2c/>



## CP<sup>2</sup> Center Patron Program Update

By Dr. Gary Hicks, CP<sup>2</sup> Center

The CP<sup>2</sup> 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 (CP<sup>2</sup>C) 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.

But the Center is funded only by contracts with agencies such as Caltrans and CalRecycle 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, participation in events to promote pavement preservation, and delivering training classes. This funding must come from non-contract sources such as our Patrons Program. Donation of used lab equipment is another way of supporting the Center.

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Co-Chairs for the group are currently Dr. Gary Hicks, CP2C, and Dr. Hans Ho, Telfer Highway Technologies. Dr. Ho plans on stepping down at the end of May 2016, so we will be looking for another industry co-chair.

A Patrons meeting is being planned for late May at the Center at CSU, Chico.

For more information on joining our Patrons Program, please contact Co-Chairs, Dr. Gary Hicks at [rghicks@csuchico.edu](mailto:rghicks@csuchico.edu) and/or Dr. Hans Ho at [handsho@telfercompanies.com](mailto:handsho@telfercompanies.com). More information on the Program can also be found on the Center's website at <http://www.csuchico.edu/cp2c/>



## Chip Seal Data Needed! An Update On Performance Modeling For Rubberized Asphalt Technologies (Phase II)

By Ding Cheng and R. Gary Hicks, CP<sup>2</sup> 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 rubberized hot mix asphalt (RHMA) using data from Caltrans and local agencies. The improved performance of asphalt rubber mixes was clearly demonstrated for all the HMA projects investigated and reported in our December 2015 newsletter. 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. So we need your support in supplying data from your chip seal projects of all types.

### 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 includ-

ing Asphalt Rubber (AR), Terminal blends (TB), 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), and other agencies.
- Develop education and outreach materials that incorporate the rubberized chip seal performance curves as well as the performance curves for asphalt rubber hot mix.
- 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.



Figure 2. Chip Seal Complete, Riverside, CA

### Update on the Progress

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

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To date we have completed an extensive literature review on performance models that have been used for chip seals in the USA and have conducted a survey of the Caltrans districts and County Public Works directors to determine the types of chip seals that they use and how they have performed. We have not surveyed cities since most of the chip seals they employ are part of a cape seal or an interlayer used under a hot mix, either conventional or



**Figure 3. Chip Seal on the Angeles Crest Highway**

with CRM. We expect to have the findings from these surveys available for inclusion in our June newsletter.

Here's where you can help. We continue to look for data from local agencies on the types of chip seals they have used, and whether we can review some of their field projects to help with the development of the performance curves. If your agency uses chip seals (con-



**Figure 4. Chip Seal, Sonoma County, CA**

ventional, polymer modified, terminal blends, or asphalt rubber), please contact either Ding Cheng or Gary Hicks at the CP2 Center. We



**Figure 5. Applying a Chip Seal, West Marin, CA**

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.



We will be also working with the MTC to help integrate some of these models into their StreetSaver pavement management system in the summer of 2016. If any agency using the Micropaver or other pavement management systems wishes to work with us, please let us know.

For more information contact: Dr. Gary Hicks at [rg Hicks40@csuchico.edu](mailto:rg Hicks40@csuchico.edu) or Dr. Ding Cheng at [dxcheng@csuchico.edu](mailto:dxcheng@csuchico.edu)



## Mark Your Calendar (Coming Events)

### 2016 National Pavement Preservation Conference - Mark your calendars

The second national conference on pavement preservation will be held in Nashville TN on October 11-14, 2016. The National Center for Pavement Preservation is coordinating the entire program which will consist



of technical presentations, field demonstrations and exhibits. The technical committee headed up by Larry Scofield (IGGA) and Rob Birdsall (FP2) have put together a draft program which should be finalized in the near future. The program will also include field demonstrations of the construction of several preservation treatments. For more information, please refer to the conference website at <https://tsp2pavement.pavementpreservation.org/2014/09/26/2016-national-pavement-preservation-conference-nashville-tennessee/>

### CalAPA Spring Asphalt Conference & Equipment Show, April 20-21 (Ontario)

Hear from top policy-makers and respected experts from across the country on topics that will directly impact your business or your agency now and in the future.

Topics will include: best practices in Hot Mix Asphalt design; specifications; testing; paving; future trends; research projects. Updates on legislation and funding for road construction and maintenance will also be included. For more information go to: [www.calapa.net](http://www.calapa.net)

### Mix Design Technology Certification (Asphalt Institute) April 5-8 (Irwindale)

The Mix Design Technology Certification (MDT) course provides advanced technicians, designers, and engineers with a thorough understanding of the properties of the materials which compose asphalt mixtures, as well as the physical and mathematical processes involved in producing a successful asphalt mixture design. Students will receive training over the entire range of activities related to the design of asphalt mixtures: aggregate and binder selection, material properties, development of trial blends, batching, volumetric calculations and analysis, Superpave mix criteria, mix performance tests and criteria, use of RAP in asphalt mix designs, plus an overview of SMA and open-graded mixtures. For more information go to: <http://www.asphaltinstitute.org/mix-design-technology-certification/>

### Principles of Constructing Quality Asphalt Pavements (Asphalt Institute)

May 17 (Los Angeles)

May 19 (San Francisco)

Constructing high quality asphalt pavements is the goal of our industry. You can learn to produce high quality pavements by learning the basic principles of hot-mix asphalt pavement construction and the inspector's responsibilities at the various stages in the construction process. You will develop a general understanding of hot-mix materials, production, placement and compaction operations. Extra attention will be given to mix placement and compaction. The workshop is geared for the technician level and as a basic refresher course for the practicing engineer.

For more information go to: <http://www.asphaltinstitute.org/asphalt-academy-classes/>

**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 CP<sup>2</sup> Center, or the State of California.**

Caltrans established the California Pavement Preservation (CP<sup>2</sup> 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. CP<sup>2</sup> Center News is published quarterly by the CP<sup>2</sup> Center, Langdon Hall Suite 203, California State University, Chico, Chico, CA 95929-0603