



# CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

No. 47

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## Caltrans Constructs Scrub Seal Pilot Project

By DingXin Cheng and Lerose lane, CP<sup>2</sup> Center, and John Fox, Caltrans District 9

Caltrans District 9 constructed a scrub seal pilot project on SR 158 near June Lake in Mono County between June 3 and June 7, 2018. Figure 1 shows some Caltrans and CP<sup>2</sup> Center staff at the job site. The contractor for the project was America Pavement Systems, Inc. The project included a scrub seal coat with fine 1/4 inch chips over a thin high binder rubberized asphalt overlay that was constructed in 2008. This scrub seal utilized a polymer modified rejuvenating asphalt emulsion (PMRE) that was 'scrubbed' (broomed) in to the old surface to fill cracks and voids in the



Figure 1. Left to Right: Ding Cheng, Joe Blommer (Caltrans), Bradley Larson (Caltrans) at the Job Site

pavement with a broom attached to the emulsion distributor truck. A scrub seal was chosen over a chip seal because the pavement had more crack distresses. It was very similar to a chip seal, but with three primary differences:

The emulsion had a pavement rejuvenator added. A broom assembly was attached to the distributor truck to force more PMRE into the pavement cracks during application. The emulsion had a heavier application rate, and a "wave" of emulsion is in front of the broom assembly as it is applied.

- The emulsion had a pavement rejuvenator added.
- A broom assembly was attached to the distributor truck to force more PMRE into the pavement cracks during application.
- The emulsion had a heavier application rate, and a "wave" of emulsion is in front of the broom assembly as it is applied.

This project, along with other pilot projects, is being used to explore the potential use of scrub seal coats and expand the Caltrans toolbox to include this pavement preservation strategy. In addition, as a good steward of California's environment and with limited resources, Caltrans is considering ways to further reduce emissions and greenhouse gases. These include using materials that are low on emissions, such as PMRE.

The objective of this pilot project is to develop a standard special provision (SSP) specification, and to verify performance of the PMRE on an extremely distressed section of highway in a

highmountain environment. This information is intended to help develop improved specifications for scrub seal used throughout the state and understand how this treatment would perform in an adverse high mountain climate with winter snows.

### Test Section Layout

This pilot project includes four Performance Evaluation Sections (PESs), as shown in Figure 2. Each PES is 500 feet long, and the existing condition of each PES was evaluated

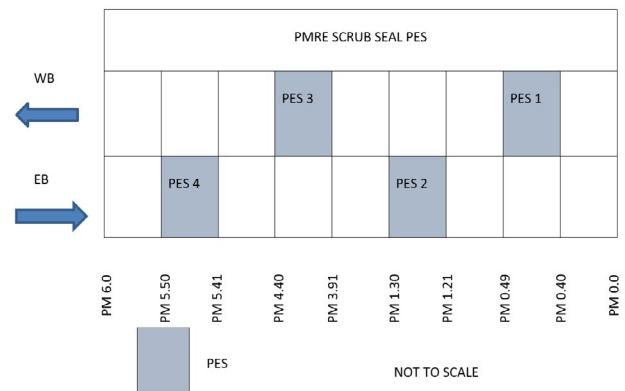


Figure 2. PES Locations for Various PMRE Scrub Seal Test Strips on SR 158

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by the California Pavement Preservation (CP<sup>2</sup>) Center with detailed crack mapping and photographs. The major distresses of the existing pavement included coarse raveling, longitudinal and transverse cracking, fatigue cracking, and block cracking.

#### Scrub Seal Test Section Construction

This project was planned in September 2017, but it was placed in winter suspension due to adverse weather until June 2018. During the delay, most of the wide cracks were sealed for this project. This maintenance treatment may influence how well the scrub seal retards cracking.

The construction of the rejuvenating scrub seal coat included preparing the pavement surface; applying PMRE and scrubbing the emulsion into the cracked pavement with a scrub broom attached to the distributor truck; applying screenings; rolling the screenings; sweeping and disposing of excess screenings; applying a fog seal; spreading sand over the fog seal; and sweeping and disposing of the excess sand.

Figure 3 illustrates a distribution truck applying PMRE on the existing pavement with a scrub broom; Figure 4 is a computerized Bearcat chip-spreader applying 1/4 inch screenings; while Figure 5 shows a truck spreading sand over the final flush coat.



Figure 3. Distributor Truck with Brooms Applying the PMRE



Figure 4. 1/4 inch Chips Being Spread by BearCat Computerized Spreader



Figure 5. Sand Truck Spreading Sand over Flush Coat

#### Testing and Evaluation

The CP<sup>2</sup> Center collected field samples and conducted a series of material tests including aggregate (chip) gradation, Vialit chip retention tests on both laboratory and field samples. The PMRE emulsion tests include Saybolt Viscosity (AASHTO T 59), Residue by Evaporation (CTM331), Ductility (ASTM D113-07), and Elastic Recovery (AASHTO T 301-08).

#### Finished Scrub Seal Product

Overall, the project went down relatively smoothly. The equipment appeared to be in good condition, and there weren't any major breakdowns. The PMRE scrub seal had a smooth appearance and did not exhibit "corn rowing" or "roping". The PMRE went down quickly, and no reflective cracking was observed directly after application. However, visible ridges showed through scrub seal from the crack sealant in the underlying pavement. The completed seal coat, with the 1/4 inch chips (Figure 6), was quieter to drive on, and was comparable to an HMA surface regarding noise level. The 1/4 inch scrub seal transformed the pavement surface from coarse and rough to a fine smooth finish with what appears to be more than adequate surface friction.



Figure 6. Example Photos of the Finished Scrub Seal Surface

For more information regarding this scrub seal pilot project, please contact Caltrans **John Fox** at: [john.fox@dot.ca.gov](mailto:john.fox@dot.ca.gov) or CP<sup>2</sup> Center **Ding Cheng** at: [dxcheng@csuchico.edu](mailto:dxcheng@csuchico.edu).





# Pavement Preservation & Recycling Alliance (PPRA) Update

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

The Pavement Preservation & Recycling Alliance (PPRA) is a consortium of the Asphalt Emulsion Manufacturers Association (AEMA), the International Slurry Surfacing Association (ISSA), and the Pavement Recycling and Reclaiming Association (ARRA).

PPRA has created the first comprehensive network management website for agencies and road managers, which brings together pavement treatment information with useful decision making tools, stories of innovation, research and much more. Website features include:

- Which treatment is best for my road?
- Treatment resource center
- A suite of network calculators and tools
- Innovations by various agencies

- Upcoming events

You are encouraged to check out the website ([www.RoadResource.org](http://www.RoadResource.org)) to take advantage of the benefits offered by this new tool.

In addition, AEMA and the University of Arkansas have developed an asphalt emulsion certificate course on asphalt emulsions. The courses offered by this group include:

- Introduction to asphalt emulsions
- Applications of asphalt emulsions
- Manufacture of asphalt emulsions

For more information on the courses please check out the following link:

<https://training.uark.edu/professional-development/courses/introduction-asphalt-emulsion-certificate.php>



## Preparation for Surface Treatments

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

Surface treatment is a broad term used to describe a number of asphalt/aggregate systems applied to the entire surface of a pavement, usually for a sealing effect against the intrusion of water and air. This sealing effect also slows the oxidation (hardening) of the asphalt pavement. It can usually extend the service life of a pavement. Because of this benefit, surface treatments are used as part of an overall "pavement preservation" program and are applied to pavements that are still in good to very good condition in accordance with Pavement Management System guidelines.

Typical surface treatments include:

- Fog seals
- Chip seals (hot & cold)
- Scrub seals
- Slurry seals
- Parking Area Sealcoats
- Cape seals
- Microsurfacing
- Thin-Bonded Wearing Course

Most of these treatments involve the use of asphalt emulsions, which are a water-based forms of asphalt, requiring a cure or "break" period for the water to evaporate, leaving the asphalt particles to perform their sealing and bonding action. Because they rely on evaporation of water, they are warm weather, low humidity operations. So the first element of preparation is to plan to do the work only

when it's warm enough! Perhaps the only exceptions to this are: 1) hot-applied chip seals, which do not involve emulsions. but rather use a hot asphalt rubber or polymer-asphalt binder, 2) microsurfacing, which contain polymers and cement, and rely more of a "chemical break" and 3) and hot-applied thin-bonded wearing courses.

This article will focus on preparation work necessary for effective surface treatments. It should be noted that even though public agencies usually contract-out surface treatment work to specialty contractors, it's not uncommon for many of the preparation tasks to be done "in house" by agency crews.



### Typical Preparation Tasks

Typical preparation tasks for a surface treatment include;

- Cleaning the old pavement surface
- Removal of pavement markings (raised markers, thermoplastic striping)
- Masking of "street iron" (manhole covers, utility boxes, drain inlet grates)
- Sealing of Cracks
- Digouts & Patching (of localized problem areas)
- Leveling & Rut-Filling
- Key (wedge) cuts

Of course "administrative"

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preparations must also be made – things like press releases and news articles, notifying the neighborhood, posting ‘no parking’ signs, arranging for tow – away service, ensuring access for equipment and haul trucks and arranging for staging areas, if necessary.

Let’s look more closely at the jobsite preparation tasks.

#### Cleaning the old pavement

The success of any surface treatment depends on the asphalt binder sticking to the old surface. Perhaps the single biggest deterrent to good adhesion is dust. Therefore, the old surface must be clean. As a minimum, power brooms or street sweepers should be used shortly before the surface treatment.

#### Removal of pavement markings (raised markers, thermoplastic striping)

It’s usually not necessary to remove painted striping, but raised markers and thermoplastic stripes (e.g. crosswalks) and legends (e.g. arrows) should be removed - usually by grinding. In some cases the surface treatment can be placed so as to avoid (and preserve) existing special markings. Temporary markers – usually the peel-and-stick stand-up reflector type – should be installed to serve until the permanent lane striping is applied.

#### Masking of “street iron”

Street iron such as manhole covers and valve box covers should be protected by masking them with paper or special plastic sheeting. Small peel-and stick markers should be attached to the metal to reference the location of the iron to facilitate removal of the masking material after the surface treatment is applied. Reference staking or GPS logging may also be used for this.

#### Sealing of Cracks

Existing cracks wider than ¼ inch should be sealed with specialty crack sealer material. Both hot and cold applied products can be used. The sealant supplier should be consulted as to the proper product for your location and climate. In climates that experience extreme fluctuations in temperature (e.g. mountains, desert), pre-routing of transverse cracks should be considered. When sealing cracks, care should be taken to:

1. Try to place the sealant only into the crack.
2. Not leave excessive smearing of sealant on the surface of the pavement.
3. Not leave sealant high so as to form a ridge or bump that motorists would feel. (A squeegee tool should be used where needed to knock down high spots.)

Crack sealing may be done days or weeks ahead of the surface treatment. If sand is used to prevent tracking of the sealant, a thorough sweeping must be done prior to placing the surface treatment.

#### Digouts & Patching

Although surface treatments are intended for roads still in good condition, there may be some localized pavement problems. These usually take the form of “alligator” cracking or disintegration in a wheelpath of the lane, indicating a load-related, structural failure. These areas should be repaired before placing a surface treatment. The usual approach is to dig out the bad material and replace it with new hot mix asphalt (HMA). Cold mix or proprietary “pothole patch” materials should not be used for patching prior to a surface treatment. They contain volatile elements that would be sealed in by the surface treatment, keeping them from hardening or sticking. An unstable, soft spot could result. Digout & patching operations are also sometimes referred to as “mill & fill”, “plugging” or “R&R”. Guidelines for proper digout & patch work include:

1. Layout a cut line at least 1 foot beyond any visible cracking.
2. Use straight lines and square corners to create the cut lines.
3. Try to keep longitudinal cutlines out of the wheelpath.
4. For patches thicker than 4 inch make cut wide for a small roller to fit into the trench for compacting the base material and lower enough lifts.
5. Excavate deep enough to permit the new HMA patch to be at least 50% thicker than the old pavement that failed. (This will mean removing some of the aggregate base layer.)
6. After excavating, always compact the remaining base material
7. Use an HMA mix type appropriate for the traffic loading.

The surface of a new HMA

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patch will be more “open” (porous) compared to the surrounding old pavement that has been under traffic for years, so an important final step is to apply a fog seal of asphalt emulsion to the surface of the new patch. This will help seal the surface so it won’t absorb the binder in the future surface treatment.



Figure 1. Preliminary Crack Sealing and Patching

#### Leveling

Some surface treatments (e.g. chip seals, slurry seals) should not be placed on surfaces with rutting in the

wheelpaths. In the case of chip seals, the watery emulsion that’s spray-applied will simply pond in any ruts and result in the chips being fully imbedded or “drowned” in asphalt, resulting in an asphalt-rich, slick wheelpath. In the case of slurry seals, excess slurry mixture will be deposited in the rutted area and will later be unstable under traffic – especially in hot weather. So it’s important that the pavement be checked with a straight edge and excessive rutting be corrected via “leveling” work. So how is leveling accomplished? The most HMA leveling course

- usually with aggregate no larger than ½ inch  
- and “feathering” the edges by careful hand raking to remove larger aggregate. This is followed by rolling. In more severe ruts, say > 1/2 inch depth, rolling should be done with a rubber-tired (pneumatic) roller. A rutted pavement may also be leveled by filling the ruts with microsurfacing, or by grinding it down with either a diamond grinder or a milling machine. These operations often involve subcontractors with special equipment, and may not be cost effective. Remember also, that after any milling or grinding, it’s important to thoroughly sweep and possibly wash the surface to remove the dust created by the operation.

#### Summary

Surface treatments are important “workhorse” strategies used by pavement managers nationwide. Like many operations – including painting your house – their success depends highly on the degree of preparation that’s done on the old pavement. When applied to pavements still in good condition, and with an effort on preparation, these pavement preservation procedures will fulfill their mission of extending the life of a pavement, and protecting this important investment.



## Asphalt Institute Training Available By Robert Humer, Asphalt Institute

The Asphalt Institute (AI) is the international trade association of petroleum asphalt producers, manufacturers and affiliated businesses. Founded in 1919, the Institute’s members represent 90% of the liquid asphalt produced in North America and an increasing percentage in international markets.

Our network of regional engineers throughout the United States and Canada provides technical support to member companies, users and specifying agencies through on-site job visits, consulting, training, presentations and information gathering. With special arrangements, field engineers are available to international members as well. California’s AI Engineer is Robert Humer located in Westlake Village.

The Laboratory of the Asphalt Institute is a leading facility in asphalt industry research, testing and analysis. Our lab is recognized for leadership in solutions to technical issues that impact the asphalt industry, and it serves as a focal point for the application of new technology based on the highest standards of performance.

The Asphalt Institute promotes the use of asphalt-based products through our involvement

in an industry coalition whose mission is to further the use and quality of Hot Mix Asphalt (HMA) pavements through research, technology transfer, engineering, education and innovation.

Asphalt Institute publications and seminars educate users and specifiers on proper practices for the design, construction, maintenance, and rehabilitation of all types of asphalt pavements.

Educational offerings include live classes throughout the United States, and also online webinars. Current offerings cover topics including: Asphalt binders, HMA mix design, Principles of Constructing Quality Asphalt Pavements, as well as Pavement Maintenance and Pavement Rehabilitation.

Special classes on airfield pavement design and construction are also offered, and special training and Certification for asphalt technicians is done at the AI Headquarters Laboratory in Lexington, KY. Live seminars are fee based. The online webinars are offered free or at a low cost of \$50 to \$85. For more information go to: <http://www.asphaltinstitute.org/training/>

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## NCAT Test Track Reports

The latest in a series of reports is available documenting the findings from experiments at the NCAT Test Track near Auburn, Alabama.

The National Center for Asphalt Technology (NCAT) Test Track has been a successful pavement proving ground for the past 15 years. The 1.7-mile oval Test Track is a unique accelerated pavement testing facility that brings together full-scale pavement construction with high-speed, heavy trafficking for detailed analysis of realistic asphalt pavements.



Figure 1. NCAT Test Track

The NCAT Test Track is funded and managed as a cooperative project. Highway agencies and industry sponsors have the opportunity to explore specific research needs that can be evaluated in one or two test sections, and broader research needs of the asphalt pavement community can be met through experiments involving several test sections. Since the results of the track's experiments are typically evident in the performance of the sections, the findings are generally easy to interpret. This gives highway agency sponsors confidence to make decisions regarding their specifications for materials, mixes, construction practices, as well as pavement design methods that can improve the performance of their roadways. Industry sponsors can also use the track to demonstrate their product or technology to the pavement engineering community.

There are 46 different test sections on the track. Each section is nominally 200 feet in length. In some cases, a test section may be divided into two subsections. Twenty-six sections are located on the two straight segments of the track, and 10 sections are located in each of the two curves. Test sections are sponsored on three-year cycles. Each cycle consists of three major parts: 1.) building or replacing test sections, normally takes about six months, 2.) trafficking of the test sections, collection of field performance data and pavement response data,

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

and laboratory testing of the plant produced materials sampled during construction. Trafficking is accomplished with a fleet of 8 heavily loaded tractor-trailer rigs to provide approximately 10 million 18,000-pound equivalent single-axle loads (ESALs) within a two-year period, and 3.) forensic analyses of damaged sections to determine factors that may have contributed to the observed distresses.

The first Test Track cycle began in 2000. Experiments of the inaugural cycle focused only on surface mix performance in the 46 test sections. The pavement structure under the experimental surface mixes was built with approximately 20 inches of asphalt pavement over a granular base and a stiff subgrade to isolate damage to only the surface layers.

The second cycle, started in 2003, included 26 of the original test sections built in 2000. These were left in place to further evaluate their performance through the second cycle. Fourteen sections had new surface layers, and eight sections were entirely new pavement structures. These were the first "structural sections" designed and built to analyze the entire pavement structure, not just the surface layers. Construction of the structural sections was done by removing the original thick pavement structure down to the subgrade material, then rebuilding the subgrade, aggregate base, and asphalt layers to result in test sections with asphalt pavement thicknesses of 5, 7, and 9 inches. Strain gauges, pressure plates, and temperature probes were built into the structural sections to monitor how the sections responded to traffic and temperature changes.

The third cycle of the track started in 2006. Twenty-two new sections were built, including 15 new surface mix performance sections, five new structural study sections, and two reconstructed structural sections. Eight original sections built in 2000 remained in place and accumulated 30 million ESALs by the end of the third cycle. Sixteen sections from the second cycle remained in place and carried a total of 20 million ESALs by the end of the third cycle.

The track's fourth cycle began in 2009 and was completed in 2012. Three of the original surface mix performance sections built in 2000 remained in place and had accumulated 40 million ESALs by the end of the fourth cycle. Nine sections from the 2003 track (seven mix performance and two structural)

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remained in place and had accumulated 30 million ESALs. Nine sections from the 2006 track (eight mix performance and one structural) remained in place and had accumulated 20 million ESALs. Twenty-five new sections (12 mix performance and 13 structural) were built for the 2009 research cycle. All totaled, the 2009 Track consisted of 16 structural sections, 30 surface mix performance sections, and 21 sections

from previous research cycles (three from 2000, nine from 2003, and nine from 2006). The new report summarizes key findings from the previous cycles and documents the experiments, analyses, and also findings from the fifth cycle of the Test Track conducted from 2012 to 2014. The NCAT reports can be found at: <http://eng.auburn.edu/research/centers/ncat/files/technical-reports/rep16-04.pdf>



## New Concrete Streets for Los Gatos

By Clay Slocum, P.E., California-Nevada Cement Association

Located about 15 miles southwest of San Jose, the Town of Los Gatos has a population of about 30,000, and is situated in Silicon Valley, home to many high-tech companies.

In the 1930's, 10 concrete pavement roads were built in Los Gatos, and now history is being made a second time. After more than 85 years of service, the roads were reconstructed with concrete pavement to capture the life-cycle



Figure 1. New Concrete Street in Los Gatos

cost benefits concrete can provide.

The Almond Grove neighborhood is on the fringe of the city's historic downtown area. The neighborhood was originally incorporated into the Town of Los Gatos in 1865 following the acquisition of an almond orchard from a local farmer. The original concrete roads were constructed in the early 1930's. The 1931 paving contract reveals the project cost of \$57,000 included soil excavation, and hauling, as well as placement of the new concrete pavement. Concrete was the default pavement material of choice after the town adopted and exclusively used what was called "hydraulic concrete" for all of its paving projects, beginning in 1928. Hanrahan Paving Company of San Francisco was a premier contractor in their day and won the contract.

Most of the neighborhood's historic roads were built as 5-inch thick jointed plain concrete pavement (JPCP). The concrete slabs were generally large with transverse joint spacing of 20 feet

and longitudinal joint spacing of 22 feet. The typical section features a 6-foot grassy strip separating the road from a 5-foot sidewalk.

Although the amount of traffic for which these roadways were designed is unknown, the current population is six times greater than it was in the early 1930's. In spite of increased traffic and the age of the roads, only minor patching has been required during most of the pavements' lives, but recent pavement condition analyses reflected the need for complete reconstruction.

There are several notable aspects of the project, beginning with planning, and continuing through the construction and the use phases.

**Planning** - Collaboration and planning have been keys to the reconstruction of the Almond Grove neighborhood. The design team was made up of the Town Engineer as well as several consultants from NCE Engineering.

The design team worked closely with Town staff, residents, and industry to explore design philosophy, pavement materials, environmental benefits, and much more. The final design matched the preferred solution of the residents, as indicated by a neighborhood-wide vote.

Another reason neighborhood residents voted in favor of concrete pavements was because of its sustainability features, including its albedo characteristics, which make it both more reflective and cooler to the touch than asphalt pavements, and in turn, reduce the 'urban heat island' impact.

**Design** - Despite the original roadways lasting upwards of 85 years, the design team found a few items to improve upon. Shortened joint spacing was determined to be a key component to reducing or eliminating future cracks, especially those that occur in a natural pattern. The shortened joint spacing also facilitates utility cuts, which, if needed, *Continued, next page*

would allow full-panel replacement to restore the aesthetics and ride quality quickly and inexpensively. One challenge of this project was to preserve the aesthetics and other qualities of the historic streets

while modernizing utilities and bringing everything up to current standards.

**Alternate Design/Alternate Bidding** - Town staff and consultants prepared full plan documents for both asphalt and concrete pavement alternatives. The 'Alternate Design/Alternate Bidding' (AD/AB) process was used, which meant each pavement-type alternative was sent out for bid by contractors, with the understanding only one type would be used. According to the Federal Highway Administration (FHWA), public agencies using AD/AB have reported several advantages in using this contracting technique, which include increased competition, lower unit construction costs, and flexibility in design, construction, and bidding.

Each of these benefits were realized with the Los Gatos project. Concrete pavement received six bids, while asphalt pavement received seven bids. This represented a noticeable increase in bidders compared to regular roadway projects in the Town. Having the two types of bids also allowed the Town staff and Council to verify their budgeting assumptions and make the most informed decision possible.

**Construction** - FBD Vanguard Construction (Vanguard) won the concrete pavement bid for both stages of the neighborhood reconstruction. Based in Livermore, Vanguard works with Caltrans and other public agencies to provide quality concrete pavement construction. During construction, Vanguard took extra steps to assist residents in Los Gatos who could not use their driveways during the concrete curing period.

The concrete was broom finished, which provides pedestrians and vehicles with added traction for safety. Very thin saw blades were used to create the joints in the concrete. The brooming and the thin joints helped create a smooth surface free of wide gaps or aggressive textures that hamper bicycle, skateboard, and stroller use.

**Considering the Future** - As the project was being planned, Town officials wanted a picture of future maintenance costs, and requested



**Figure 2. Broom-textured Concrete Pavement in Los Gatos**

data to determine future maintenance costs prior to selecting pavement type. NCE completed a life-cycle cost analysis (LCCA) to quantify the expected value of all future repair work for the competing alternatives.

The LCCA showed that although the initial costs of concrete were higher by around 10%, the analysis showed concrete pavement was expected to have one-third to one-fifth of the long-term maintenance when compared to asphalt. The LCCA showed concrete pavement could provide an approximate 25% cost savings compared to the asphalt alternative.



The Town of Los Gatos, as well as neighborhood businesses, residents, and visitors now have concrete pavements that should last for many years. As technology continues to grow, it's likely that autonomous vehicles and other technological advancements will continue to develop and appear in neighborhoods such as Almond Grove.

At some point, embedded guidance technology, driverless cars, and other transportation developments may be commonplace on these and other concrete streets.

"The Town of Los Gatos reconstructed the Almond Grove concrete streets to preserve the historic nature of the area and also to provide a roadway that, with minor maintenance, should perform well for many years," says **Lisa Petersen**, Town Engineer and Assistant Public Works Director for Los Gatos.

Although it's impossible to predict the future, it is not only possible, but feasible that these concrete streets should be in service well into the future.

For more information contact **Clay Slocum** at: [clay.slocum@cncement.org](mailto:clay.slocum@cncement.org)





## FHWA Update

As part of the [pavement preservation \(when, where, and how\)](#) initiative, transportation agencies are participating in workshops and peer exchanges focusing on effective strategies and practices.

Participants from 21 State agencies and Federal Lands Highway shared their experiences and



Figure 1. Participants at FHWA Peer Exchanges

lessons learned on pavement preservation at FHWA peer exchanges in Colorado, Connecticut, and Georgia. Attendees discussed good practices for pavement management systems, such as using decision trees to aid in selecting pavement preservation treatments. They reviewed resources such as the [OPTime tool](#), which helps identify the best time to apply preventive maintenance treatments, and the second Strategic Highway Research Program [R26 preservation](#) analysis tool, which aids in the selection of pavement preservation treatments for high volume roadways. A peer exchange report set for fall 2018 publication will include a pavement preservation benefits calculator tool.

Register for the [EDC-4 Pavement Preservation 'How' Workshop](#) on September 10 and 11 in Portland, OR. The workshop covers in depth construction practices for both asphalt and concrete pavement preservation treatments

By Jason Dietz, FHWA

and ability for attendees to ask specific construction questions

Just released is a Federal-aid Essentials Concrete Pavement Preservation video and by January 2019 the asphalt pavement preservation video will be available.

In 1991, FHWA established a [Pavement Preservation Expert Task Group \(PPETG\)](#) in which they advance and improve the state of the practice in pavement preservation by working collaboratively with federal, state, local agencies, industry, and academic interests. Now, the areas the PPETG working groups are working on: 1) Update Research Roadmap, 2) Research Statements, 3) Definitions, 4) Outreach, and 5) Pavement Preservation Quality Assurance. The next PPETG meeting is being planned for December 12 and 13 in Oakland, CA. Later this fall a webinar is being scheduled to discuss the characteristics of a "world class" pavement preservation program.

Plan to attend the International Slurry Surfacing Association's [Slurry Systems Workshop](#) on January 21 to 24, 2019, in Las Vegas, NV. The workshop will feature sessions and demonstration projects on slurry seal, micro surfacing, chip seals, and crack treatments. Contact **Jason Dietz** of the FHWA Resource Center for information on pavement preservation workshops and peer exchanges at:

[jason.dietz@dot.gov](mailto:jason.dietz@dot.gov)



## CCPIC Update

Launched in 2017, the City and County Pavement Improvement Center (CCPIC) is a partnership of the University of California Pavement Research Center at UC Davis and UC Berkeley, the Institute of Transportation Studies at UC Davis and UC Berkeley, California State University at Long Beach, Chico, and San Luis Obispo, the California League of Cities (LOCC), the California State Association of Counties (CSAC), and the County Engineers Association of California (CEAC).

CCPIC will hold its first Governing Board meeting in Davis on September 28. The governing board includes representatives from six cities and six counties.

The results of the 'Voluntary Additional Survey to Help Advance Understanding of Local Streets and Roads Needs and Issues' (that was part of the Local Streets and Roads Needs Assessment)

By John Harvey, UCPRC, CCPIC

were presented to the assessment oversight committee in June. The final report will be posted on the CCPIC website by September 1st. The results will be presented to the Governing Board and used to help guide the CCPIC program.

### Life Cycle Cost Analysis

A simple life cycle cost analysis (LCCA) spreadsheet tool, downloadable on the CCPIC website (below), has been developed for comparing pavement treatment alternatives during the conceptual design stage and when evaluating maintenance treatments for use in pavement management. A training session was held in Davis for several East Bay agencies, and it is currently being used in a pilot program with the City of Berkeley. A webinar on use of LCCA by local agencies and use of the tool will be held in the fall.

[Low-cost training from CCPIC](#) *Continued, next page*

GENERAL  
NEWS

CCPIC wants to make sure you get the training you need to utilize the most advanced, cost-effective, and sustainable pavement practices possible to better repair and maintain California's roadways. Some popular



Figure 1. CCPIC Training Session hosted by City of Orinda

Stabilization Strategies (IDM-06), in May 2018 to a full house hosted by the City of Orinda, California. We are looking to repeat this class several more times around the state over the fall, winter and spring. Local governments who pavement training classes offered by the Technology Transfer Program at UC Berkeley are now offered with dramatically reduced registration fees for California's local agencies.

So far under this program, CCPIC has held one class, In-Place Asphalt Recycling and are interested in organizing with other nearby cities and counties and hosting please contact **Dave Jones** (530-754-4421, [dijones@ucdavis.edu](mailto:dijones@ucdavis.edu)) or **John Harvey** (510-206-8349).

Other upcoming courses via U.C. Berkeley Tech

Transfer Program are listed below. (Also see the "Coming Events" section of this Newsletter.)

- Pavement Management Systems and Preservation Strategies (IDM - 28)
- October 24-25 - Costa Mesa - \$95 Public Agency Fee

Taught by **Margot Yapp** and **James Signore**, you will learn fundamentals of pavement management, from street inventory and pavement condition surveys, to condition indices, quality management, maintenance treatment selection, project prioritization, and more.

Asphalt Pavement Maintenance & Rehabilitation (IDM-04)

- November 6 - Richmond - \$75 Public Agency Fee
- December 4 - Los Angeles - \$75 Public Agency Fee

Taught by **Roger Smith**, this course packs the most common pavement maintenance and rehabilitation practices you need to know into one training day, beginning with basics of pavement materials and distress, and covering crack sealing, patching, surface seals, microsurfacing, overlays, and recycling.

For more information on these classes and to register, visit [www.techtransfer.berkeley.edu/schedule](http://www.techtransfer.berkeley.edu/schedule).

For more information on CCPIC, go to: [www.ucprc.ucdavis.edu/ccpic](http://www.ucprc.ucdavis.edu/ccpic).



## AASHTO TSP 2 Emulsion Task Force Update

By Colin Franco, Rhode Island DOT and Gary Hicks, CP<sup>2</sup> Center

The Emulsion Task Force (ETF) was established by the Federal Highway Administration in 2008 with an original mandate to do the following:

- Develop AASHTO performance-based methods and specifications for asphalt emulsions (SPG).
- Develop AASHTO specifications for emulsion treatments in the AASHTO format, including materials specifications, design-practices, and contraction guides (including quality assurance (QA) specifications).

Since the formation of this group, considerable progress has been made and the AASHTO TSP 2 program now administers the ETF. At the last meeting, held on June 20-21, 2018 at the Heritage Group Innovation Center in Indianapolis, we discussed the progress made on specifications and construction guides for

emulsions and pavement preservation treatments. At the present time, the following AASHTO materials specification and design practices have been completed:

- Revision of the emulsion binder specs M 140-16, M 208-16, and M 316-16
- MP 27-16 (2018) Materials for Emulsified Asphalt Chip Seals
- MP 28-17 (2018) Materials for Micro Surfacing
- MP 31-17 Materials for Cold Recycled Mixtures with Emulsified Asphalt
- MP 32-17 Materials for Slurry Seal
- MP 33-17 Materials for Emulsified Asphalt Fog Seal
- MP 34-18 Materials for Sand Seals
- MP 36-18 Materials for Asphalt Tack Coat
- MP 38-18 Mix Design of Cold Recycled Mixture with Foamed Asphalt

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- R 77-16 Standard Practice for Certifying Suppliers of Emulsified Asphalt
- R 78-16 Recovery Residue from Emulsified Asphalt Using Low Temperature Evaporative Techniques
- PP82-16 (2018) Emulsified Asphalt Chip Seal Design
- PP 83-16 (2018) Micro Surfacing Design
- PP 86-17 Emulsified Asphalt Content of Cold Recycled Mixture Designs
- PP 87-17 Slurry Seal Design
- PP 88-17 Emulsified Asphalt Fog Seal Design
- PP 90-18, Sand Seal Design
- PP 93-18 Asphalt Tack Coat Design

Currently, the ETF is working on materials specifications and design practices for scrub seals, thin bonded wearing courses, and foam asphalt stabilization. Construction guides have been developed for chip seals, microsurfacing, and fog seals as a part of NCHRP project 14-37

and the ETF plans to develop research project statements for construction guides for the remaining treatments.

In addition, the ETF is working on test methods chip seals that were developed as a part of the NCHRP 14-17 project and as NCHRP Report 680, as well as performance-related specifications for emulsions. An in-house test program to support these efforts has been conducted and is being analyzed by the Asphalt Institute. A new NCHRP 9-63 project has also been approved for this work, which will likely be awarded this fiscal year. Finally, the ETF is working on QA protocols for all the treatments. The first one has been completed for chip seals, and the others will be worked on in the next year.

At the next meeting of the ETF, scheduled for late November in Indianapolis, work will continue on all the unfinished projects. For more information on the ETF's activities, go to: <http://tsp2-etf.org/>



## Updating the Pavement Preservation Research Roadmap

By Judith Corley-Lay, Director NCPP

The existing "Transportation System Preservation Research, Development and Implementation Roadmap" was published in January 2008 and served the pavement preservation community for 10 years. The 2008 Roadmap, which included both pavement and bridge preservation, was developed by bringing together practitioners, consultants, industry personnel and academicians for multi-day workshops.

The Pavement Preservation Expert Task Group (PPETG) has voiced that the pavement preservation roadmap needs to be updated and Federal Highway Administration (FHWA) has funded a project to accomplish this task. The project was awarded to Principal Investigator **Steve Tritsch** from Iowa State University, and his team includes **Judith Corley-Lay**, **John O'Doherty** and **John Hooks**, all from the National Center The Pavement Preservation Expert Task Group (for Pavement Preservation (NCP), and **Larry Scofield**, from the American Concrete Pavement Association.

Six topic areas were selected by the research team: Asset Management, PMS and Pavement Preservation, Treatment Design, Materials, Treatment Application and Contracting, Performance Benefits. The first topic deals with planning pavement preservation programs, using a variety of PMS data and tools and ultimately

considering pavement preservation as part of the agency's asset management plan.

Treatment design relates to treatment selection and the improvement of treatments by using a design process to set the materials and their application rates. Materials covers items including specifications, the impact of use of sub-standard materials, consideration of new materials and additives, and recycled materials. Treatment application and contracting deals with construction practices and contracting methods, as well as their benefits and limitations. Performance includes both the performance period of the treatment and the performance of the road way. Identification of appropriate performance measures and methods of collecting them are part of the performance topic. Finally, benefits include economic benefits, improvement of system condition, impacts on vehicle operating costs, reduced user delays, sustainability, and safety impacts.

Outreach for the project is being done via Go-To-Meetings (G2Ms), with one meeting each covering the umbrella topics: Participants are being sought from a variety of contact lists including attendees of the regional pavement preservation partnership meetings, the PPETG, the Emulsion Task Force, industry sponsors of the Transportation System Preservation Technical Services program (TSP 2),

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the Transportation Research Board technical committee AHD18, university centers on pavement preservation activities and consultants with relevant experience. The schedule for the upcoming G2Ms is shown in Table 1.

Anyone who has an interest in participating in one or more of the G2Ms may email their request to **Judith Corley-Lay** ([corleyla@egr.msu.edu](mailto:corleyla@egr.msu.edu)). Alternatively, you can email her your ideas in any of the topic areas including research needs, tools that would assist practitioners, completed research about which the team should be aware, and any research that you consider to be ready for implementation. The updated Pavement Preservation Research Roadmap will be used by FHWA, the PPETG, the ETF, AASHTO and TRB committees as a resource in developing their research needs and should reflect the thinking of the many stakeholders

of pavement preservation.

Sept. 19	11 am Eastern Time	Asset Management, PMS and PP
Oct. 10	11 am Eastern Time	Treatment Design
Oct. 24	11 am Eastern Time	Materials
Nov. 1	11 am Eastern Time	Treatment Application and Contracting
Nov. 14	11 am Eastern Time	Performance
Nov. 29	11 am Eastern Time	Benefits

Table 1. Schedule for Upcoming G2Ms

## Patrons Program Update

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 Center was established in 2006 at CSU, Chico, to provide assistance with the development and use of appropriate pavement preservation strategies, and it celebrated its 10th anniversary in August, 2016. 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 recognized pavement experts and a state-of-the-art laboratory facility, which continues to improve each year.

But the Center is funded only by its contracts with agencies such as Caltrans, CalRecycle, MTC, and also by research for some industry clients. In all cases, 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, participation in events to promote pavement preservation, organizing meetings and conferences, and delivering training classes. This funding must come from non-contract sources such as our Patrons Program.

Co-Chairs for the Patrons group are currently **Scott Metcalf** (Ergon Asphalt and Emulsions) and **Rene Verduyssen** (Knife River). The next Patrons gathering will be in the summer of 2019.

For more information on joining or supporting our Patrons Program, please contact CP<sup>2</sup>C Director **Ding Cheng** [dxcheng@csuchico.edu](mailto:dxcheng@csuchico.edu), **Scott Metcalf** [scott.metcalf@ergon.com](mailto:scott.metcalf@ergon.com) or **Rene Verduyssen** [Rene.Verduyssen@kniferiver.com](mailto:Rene.Verduyssen@kniferiver.com).

## Dr. Kun Zhang Joins CP<sup>2</sup> Center

Dr. Zhang obtained his Ph.D. from the Department of Civil and Environmental Engineering of the Washington State University (WSU) in 2016. He was a Clinical Assistant Professor at WSU and the co-director of the Washington Center for Asphalt Technology (WCAT) before he joins the CP<sup>2</sup> Center and becomes a tenure-tracked assistant professor at the CSU, Chico this fall semester. With strong pavement materials and engineering background, Dr. Zhang, as a new senior pavement

researcher of the CP<sup>2</sup> Center, will work on a variety of the Center's projects.



Figure 1. Dr. Kun Zhang at CSU Chico





## Mark Your Calendar (Coming Events)

### ***RMWPPP Regional Meeting - September 11-13 (Portland)***

The Rocky Mountain West Pavement Preservation Partnership is a regional forum of pavement professionals (state, local, & federal agencies, contractors, suppliers, and academia) working together to promote the benefits of Pavement Preservation through information sharing, education and innovation. For more information go to: [https://www.pavement-preservation.org/wp-content/uploads/meetings/2018\\_RMWPPP\\_Brochure.pdf](https://www.pavement-preservation.org/wp-content/uploads/meetings/2018_RMWPPP_Brochure.pdf)

### ***MSA Conference - October 2-4 (Indio)***

The Maintenance Superintendents' Association 50th Anniversary Conference, to be hosted by the Inland Empire/Desert Chapter, will offer presentations, training and certification in various disciplines of Public Works. For more information go to: <https://www.mainsupt.com/conference>

### ***Pavement Management Systems & Preservation Strategies - October 24-25 (Costa Mesa)***

Presented by Tech Transfer program at U.C Berkeley, this course provides the fundamentals of pavement management, from street inventory and pavement condition surveys, to condition indices, quality management, maintenance treatment selection, project prioritization, and more. For more information go to: <https://registration.techtransfer.berkeley.edu/wconnect/ShowSchedule.awp?&Mode=GROUP&Group=PAVE&Title=Pavement+Design+and+Maintenance>

### ***"Asphalt Pavement 101" Class - October 24 (Sacramento) and "Quality Asphalt Paving" Class - October 25 (Sacramento)***

Two of the California Asphalt Pavement Association's popular classes will be

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

offered in northern California. These classes provide an overview of asphalt pavement design, materials, equipment construction, and inspection basics. It's great introductory training for new hires and provides a solid refresher and update for more experienced personnel. For more information go to: [www.calapa.net](http://www.calapa.net)

### ***Nevada Infrastructure Concrete Conference (NICC) - October 23 (Reno) and October 25 (Las Vegas)***

To expand your concrete infrastructure knowledge and professional network, attend the 17th Annual NICC. There is a pavement track where better design & cost savings will be presented, besides the latest technologies for repaving and resurfacing concrete pavements. For more general information go to: <https://nicc2018.com/>

### ***APWA Public Works Conference - November 7-8 (Richmond)***

The northern California Chapter of the APWA will hold its annual conference on November 7-8 at the Memorial Auditorium in Richmond. This event includes educational forums and vendor exhibits. For more information go to: <http://northernca.apwa.net/EventDetails/14735>

### ***Asphalt Pavement Maintenance & Rehabilitation Class - November 6 (Richmond) and December 4 (Los Angeles)***

Agencies at the city and county level can maximize the value of their investment in streets by using proper pavement maintenance strategies. Presented by Tech Transfer program at U.C Berkeley, this course provides a solid working knowledge of common pavement M&R practices. Learn more at: <https://registration.techtransfer.berkeley.edu/wconnect/ShowSchedule.awp?&Mode=GROUP&Group=PAVE&Title=Pavement+Design+and+Maintenance>



**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. Mrs. Marcella Wiebke 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.

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