CP² Center News

Newsletter of the California Pavement Preservation Center

No. 66 **June 2023**

Pavement Preservation Academy – A Big Success!

By Roger Smith and Ding Cheng, CP2 Center

Figure 1. Location Map of Participants

A big achievement of the California Pavement Preservation Center (CP2 Center) has been the development and delivering of the Pavement Preservation Academy (PPA), sponsored by California's SB-1 'fuel tax' funding for workforce training.

The third offering of this online Academy occurred April 3 – 7, 2023. Over 100 people participated, mostly from California Public Agencies (State, Cities & Counties) from various parts of California, as shown in Figure 1, and about 15 from Industry.

The current Academy focuses only on asphalt pavement preservation, and the instructors are Roger Smith, Gary Hicks, Lerose Lane, Ding Cheng and Erik Updike, all well-known and respected in the world of asphalt pavement technology.

The Academy involves 5 sections, over 5 days, from 9am to noon each day. The sections are based on five manuals that have been developed by the CP2 Center and are published on the Mineta Transportation Institute (MTI) website. In addition to being used in the Academy, these manuals are free to the public and downloadable using the following links:

- Asphalt Pavement Repair and Resurfacing Preparation: https://scholarworks.sjsu.edu/mti_publications/414/
- Chip seals: https://transweb.sjsu.edu/sites/default/files/1845A-Chip-Seal-Manual.pdf
- Slurry surfacing: https://transweb.sjsu.edu/sites/default/files/1845B-Cheng-Manual-Slurry-Surfacing.pdf
- Cape seals: https://transweb.sjsu.edu/sites/default/files/1845C-Cheng-Cape-Seal-Manual.pdf
- Thin asphalt overlays: https://transweb.sjsu.edu/sites/default/files/1906-RB-Cheng-Manual-Thin-Asphalt-Overlay.pdf

As part of the PPA, follow-up exams may be taken on each of the segments, and successful completion earns a Certificate. Future sessions of the PPA are planned – at least one per year. Stay tuned for more information regarding future PPA.
For more information regarding the CP2 Center, go to: https://www.csuchico.edu/cp2c/.

IN THIS ISSUE

Caltrans CIR In The Desert

By Kenny Sante, PRS

With a project size around 328,000 square yards, Caltrans wanted to provide a more sustainable section of California State Highway 127 for travelers and the rural community of Shoshone, in Inyo County on the eastern edge of Death Valley.

ASPHALT PAVEMENT NEWS

A cold In-place recycling (CIR) process was used by Pavement Recycling Systems (PRS), to recycle the existing asphalt pavement at a partial depth of 3 to 4 inches to prepare for a final placement of 0.25' of Caltrans Type A hot mix asphalt (HMA), completed by Hat Creek Construction.

The CIR work by Pavement Recycling Systems (PRS) used their proven in-line equipment 'train' process. The mix design for the CIR portion of this project used an emulsified asphalt, "CIR-EE" (cold in-place recycling engineered emulsion) from Ergon at a content up to 3.0%, and a Portland cement additive at 0.6%, supplied by CalPortland. The Ergon binder was manufactured to be compliant with the Caltrans Standard Specification section 94-1.02E Cationic Emulsified Recycling Agent.

A PRS sister company, Wulfenstein Construction, supplied both the sand and hot mix asphalt from their plant in Pahrump, NV.

The project involved the in-place processing of over 60,000 tons of material. The end result was a strong, long-lasting and more sustainable roadway whose creation heavily reduced the amount of trucking needed to haul in new materials, reduced overall greenhouse gas emissions and required significantly less virgin aggregates.

In an earlier interview, former Caltrans District 2 Maintenance Engineer, Lance Brown, explained the effectiveness of CIR. He stated CIR is "… an intermediate strategy between minor rehabilitation and highway maintenance overlays, and went on to say, "Cold in-place recycle projects use green technology that recycles partial depth using existing pavement materials. We found that on lower average daily traffic routes in various climates, the CIR strategy is effective for 7-10 years when overlaid with a … hot-mix asphalt overlay". This description matches near perfectly with the CA-127 project with its rural location and lower traffic.

Patrick Waldron, Superintendent on the project for PRS, spoke on the effectiveness of CIR on this project. "This project was miles from civilization, a working cell phone signal and most importantly, any asphalt plants. This made the project a perfect candidate for CIR, which can eliminate the need for an asphalt plant altogether," he stated. "At a recycling depth of 4" at 135 lbs/cubic foot, approximately 66,000 tons of RAP were processed on-site, eliminating an estimated 8,766 truckloads of exported and imported materials, not to mention the greenhouse gas emissions and fuel costs associated with hauling to and from a remote location that is miles away from an asphalt plant, or the need for a dump site that you would see with a mill-and-fill project," Patrick concluded. This reduction in construction-related trucking not only reduces cost significantly, but also improves the safety footprint of a project. Trucking is a common factor in a large proportion of construction-related safety incidents, and reducing the number of trucks required to complete a project greatly reduces the potential for accidents, both within the construction site and on surrounding roads.

In addition to the truck loads Patrick mentioned above, when comparing the CIR option to a similar structural design with no recycling, the CIR option is estimated to have saved over 50,000 tons in virgin aggregate purchases and use, and prevented over 30,000 cubic yards of landfill disposal by reusing the onsite materials.

The CIR equipment train

Paving the CIR mixture

The end result was a strong, long-lasting and more sustainable roadway that, through its creation, greatly reduced the amount of trucking needed to haul in new materials, reduced greenhouse gas emissions and used significantly less virgin aggregates compared to a mill-and-fill project.

For more information go to: www.pavementrecycling.com

CalAPA Update - Spring Conference

By CalAPA Staff

The **Spring Conference** of the **California Asphalt Pavement Association** (CalAPA), held March 23-24 at the DoubleTree Hotel & Conference Center in Ontario, offered a lineup of speakers and presentations designed to inform and inspire industry and agency attendees alike. Vendor displays and an outdoor equipment show were also part of the Conference.

On the opening day Dr. Howard Marks, vice president for environment, health and safety

for the National Asphalt Pavement Association (NAPA), a CalAPA partner, took the stage to share eye-opening and timely insights on the **national regulatory** front.

A Federal Highway Administration (FHWA) update was provided by Mike Huner, a consultant with the FHWA, who recently brought FHWA's **Mobile Asphalt Technology Center** (MATC) to California, with an extended stay at the Caltrans Southern Regional Materials Laboratory (SRL) in Fontana. The large trailer showcases several newer technologies for testing asphalt materials and pavement properties.

The Conference offered numerous breakout sessions, which allowed attendees to customize their experience. These included presentations by Greg Renegar (Astec), on what the **asphalt plants** of the future will look like; Drew Delany (Associates Environmental) presenting on best practices for fleet management and accessing various incentive programs; Bob Humer (Asphalt Institute) delving on **aggregate segregation** in pavements, and Deepak Maskey (Caltrans) providing an update on the use of **Life-Cycle Assessment (LCA)** by the Department.

Outdoor Equipment Display

Other informative sessions included Caltrans Office of Asphalt Pavements Chief, Cathrina Barros, on the **Caltrans' sustainability initiatives and specification updates**. They currently have 47 pilot projects for field trials of innovations such as fibers in HMA, high (40%) RAP use, RAP use in chip and slurry seals, and RAP in rubberized HMA mixes.

Dr. John Harvey (University of California Pavement Research Center (UCPRC)) presented on the continuing success of the Caltrans **Long-life (Perpetual) Asphalt** Pavement design strategy, which was recently recognized with national awards. Long-life Pavement Design is now officially included in the Caltrans Highway Design Manual, and additional projects are being sought. Harvey also delivered a presentation wearing his other hat as director of the **City & County Pavement Improvement Center (CCPIC)**, which has numerous research and educational efforts underway aimed at assisting local governments in making the most of their pavement assets. His presentation on the essential role that **pavement compaction** plays in the durability of asphalt stimulated many questions from the audience.

An overview of the **Caltrans' Southern Regional Materials Lab** (SRL) in Fontana was presented by Sarah Hartz, Lab Manager. Since 2009 the state-of-the-art Lab has been providing materials testing services for five Caltrans Districts in Southern California.

Maurice Arbelaez (Instrotek) delved into how innovative technology is advancing how **asphalt in-place density** is measured, including 'dielectric' devices for measurements of pavement density using walk-behind rolling devices.

In conjunction with the conference, several other activities took place in near the conference center, including networking events, and an **"Asphalt Pavement 101" technical training class**, taught by Roger Smith. CalAPA also supported the **Women of Asphalt** California Branch "lunch and learn" that took place March 22 at the Caltrans Southern Regional Lab (SRL) in Fontana.

Special thanks go out to the many sponsors and exhibitors who helped make the conference a success. For more information on CalAPA and the Spring Conference go to: www.calapa.net

Rubber Pavements Workshop Held.

By Russell Snyder, CalAPA

The California Asphalt Pavement Association (CalAPA) presented an educational workshop, "Where the Rubber Meets the Road". It brought together a diverse group of experts representing government agencies, industry representatives and others to provide a 360-degree view of the pavement strategy.

The April 18 event in Sacramento, which was also streamed live nationwide, coincided with a visit to California from a delegation representing the Australian asphalt pavement industry, The Australian Flexible Pavement Association (AfPA) were especially interested in learning about the state of practice in California, and shared their own successes and challenges of dealing with waste tires in Australia.

"It was wonderful. I really enjoyed it," said Anna D'Angelo, Executive Director Technology for the Australian Flexible Pavements Association.

The CalAPA Workshop was an excellent opportunity for California agencies & industry to showcase their successes with using waste tires in asphalt pavement.

The program included speakers representing Caltrans, CalRecycle, the University of California Pavement Research Center, material suppliers, asphalt producers, paving contractors and others. Expert panel discussions focused on agency perspectives, tire rubber supplier perspectives, and asphalt producer and paving contractor perspectives.

"I think overall it went very well." said Nate Gauff, waste management engineer for CalRecycle. "It's intertwined, UC Davis, Caltrans, CalRecycle, … we're all partners and have been partners for a long time."

Nate Gauff (CalRecycle)

Tim Greutert (Caltrans State Materials Engineer)
Brandon Milar (CalAPA Technical Director, back)

Here are some 'take-aways' from this informative event:

- California generates 50 million tons of waste tires per year.
- Rubberized asphalt is the largest use of recycled tires in California.
- CalRecycle grants for local agencies' projects are now up to $20 per ton.
- 38% of Caltrans asphalt paving used asphalt rubber (RHMA-G, RHMA-O) in 2021.
- Rubberized HMA is now mandated by Caltrans for surface lifts up to 0.20' thick.
- Research is suggesting thicker lifts should be allowed.
- Research is also evaluating allowing RAP at 10% in RHMA-G
- Several non-traditional technologies for rubberized asphalt are now available (as reported by representatives from Polyco (Sigmabond), Prism (ViaTec) and LibertyTire (SmartMix), and CRM, a waste tire processor and provider of ground tire rubber).

The Aussie group reported on their expanding need to find uses for waste tires – from both automobiles and from large mining equipment. Their research is showing that tires have the ability to reduce the oxidation aging of asphalt binders in the very sunny, highly oxidizing Australian climate. They use smaller percentages of rubber in chip seal applications than in their HMA binder.

The event was sponsored by CRM, Polyco, D&H Equipment, Prism Worldwide and Sully-Miller Contracting Co.

For more information on the workshop go to: www.calapa.net
You can watch a full recording of the presentations at:
https://www.gotostage.com/channel/3fe4c16fcf8f4a2f9ddaebf4f64d82f5/recording/843fbced51e945de9776c573db8ca841/watch

(Roger Smith contributed to this article.)

New AASHTO Resources for Emulsion Treatments

By Colin Franco, RIDOT, and Dr. Ding Cheng, CP2 Center

Background

A major shortcoming of emulsion technology for pavement treatments has been the lack of National Standards available in the AASHTO/ASTM format. It is well known that for a technology to be widely accepted by state and local agencies, National Standards for that technology must be developed and made available.

In 2008, the Federal Highway Administration (FHWA) with the cooperation of the American Association of State Highway and Transportation Officials (AASHTO) industry initiated the Emulsion Task Force (ETF). The is comprised of representatives of State DOTs, Academia, and Industry.

Work Tasks & Products

Beginning in 2015 the ETF was moved under the umbrella of the AASHTO Transportation System Preservation-Technical Services Program (TSP·2). The EFT strives to fulfill these tasks:

Task I – Advance the Effort to Develop Performance-Based Methods and Specifications for Emulsions. A goal will be development of Performance-Graded Emulsions. Asphalt Institute (AI) and National Center for Asphalt Technologies (NCAT) are working on developing the Emulsion PG (EPG) through NCHRP 9-63.

Task II – Encourage Adoption of Uniform National Standards

A. Develop AASHTO Standards (Material Specifications, Design Practices, Construction Guide Specifications) for the following emulsion-based treatments:

1. Chip Seal
2. Micro Surfacing
3. Tack Coat
4. Fog Seal
5. Slurry Seal
6. Scrub Seal
7. Sand Seal
8. Bonded Surface Treatment (Nova Chip)
9. Cold Mixes – Virgin, Recycled, Cold In-place Recycling (CIR)

B. The NCHRP Program developed Construction Guidelines for Chip Seals and Micro Surfacing through its Project 13-47. NCHRP will be used for construction guide specifications for the other treatments.

Task III – Quality Assurance, Training, and Certification

A. Quality Assurance Program - Development of QA (Acceptance, Quality Control, and Independent Assurance) protocols are being addressed by an ETF Subcommittee.

B. Training and Certification –The following actions are being implemented or planned:

1. Training programs for each treatment for all personnel categories are being developed.
2. Quality Control plan requirements are being formulated.
3. Calibration and equipment performance checklists are being developed.
4. Certification of Vendors and Technical Staff is under way.

Task IV – Miscellaneous Specifications, Test Methods, Quality System and Research

Accomplishments to Date
The ETF's products produced to date can be found at: http://tsp2-etf.org/

SWCPA Workshops

PCC PAVEMENT NEWS

As part of their Concrete Pavement Education Program, the Southwest Concrete Pavement Association (SWCPA) presents a series of free online workshops on the third Tuesday of the month from 9:00 am to 10:15 am Pacific Time.

The next workshop is on June 20th and is entitled "Grinding the Way to Smoother, More Sustainable Pavements + CO2 Reduction Benefits from Diamond Grinding + Use-Phase Benefits."

The workshop presenters are Larry Scofield (IGGA), Tom Van Dam (NCE), and John Harvey (UCPRC).

This workshop is provided at no cost to attendees by SWCPA's supporters and sponsors. Registration is required prior to the event. CEU/PDH Certificates are available with attendance.
For additional information, contact Charles Stuart at cstuart@swcpa.org.

Crack Sealing's New Image?

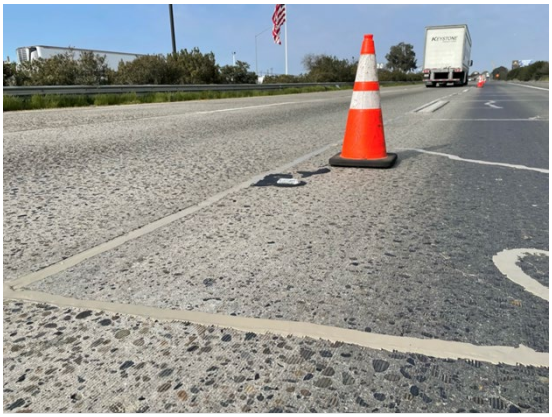
By Claire Noring, Main Street

Materials

Crack sealing is a critical component of pavement preservation, helping to prevent water from seeping into pavement and base, and causing further damage. In recent years, transportation agencies have been turning to composite crack sealants as an innovative solution that offers several benefits over traditional sealants. These hot-applied sealants, available for both asphalt and concrete pavements, are specially designed for long-term performance and low visibility, and have been shown to improve pavement aesthetics, increase safety for road crews, and offer the potential for cost and time savings.

Three years ago, Caltrans District 3 (Marysville) Sunrise Region started using CamoSeal composite sealant around Sacramento and Rancho Cordova. The grayish colored product eliminates the ugly and distracting 'black snake' lines that crack sealing leaves on roads, resulting in improved aesthetics. It also can reduce driver confusion and 'lane drift' where longitudinal joints are sealed and can compete visually with lane lines.

Composite Seal On Asphalt Pavement (Hwy 160 Sacramento)



Composite Seal On PCC Pavement (Hwy 99 in Fresno)

Steve Hardie, Caltrans District 3 Region Manager, states, "While the roadway appearance being less distorted and distracting is definitely a benefit, it's not the only driving force behind the choice to continue using composite sealants. The high cohesive strength of composites has allowed our Sunrise Region to make changes in the way they run their crack sealing program. The maintenance crews in this area no longer squeegee cracks, and can keep over-banding to the bare minimum using the composite sealants. They started slowing the flow of the sealant out of the applicator, ensuring that crews aren't dumping excessive material into cracks. The CamoSeal allows us to achieve an optimum bond without pushing material into the fracture."

The most important change Hardie has noticed while using composite crack sealants is increased safety for maintenance crews.

"Composites set in 5 minutes or less, shortening the time our crews spend on the roadway.", Hardie says. "Without the need for squeegeeing, at least two fewer people are required on a jobsite."

District 3 Sunrise Region has not returned to reseal these on-ramps and off-ramps for 3 years and anticipates only needing to revisit them 5 years after the initial placement. All of these benefits add up to less worker exposure to traffic.

According to Angelo Infante, Technical Representative for Main Street Materials, "Beyond the benefits that Caltrans District 3 has realized, composite crack sealants have the additional benefit of allowing a secondary surface treatment (fog seal, chip seal, slurry seal) to be placed within the same day as crack sealing. There's no waiting for curing of the sealant. Combining crack sealing with secondary treatments often eliminates the need for repeat lane closures resulting in less time spent out on the roadway, and less worker exposure to traffic. And contract time-lines can also be compressed."
For more information contact Angelo Infante at: ainfante@mainstreetmaterials.com

FHWA Update

By Chu Wei, FHWA – Sacramento

The Federal Highway Administration (FHWA) has published a series of three documents relating to asphalt pavements. They were developed in cooperation with the University of Nevada Reno.

A Practice for Including Intelligent Construction Equipment in Quality Assurance Programs: This report provides information about using intelligent construction equipment in a QA program conforming to 23 CFR 637.207. The report focuses on asphalt mat density for application in QA programs, but the information could be applied to other quality characteristics. You can access the report directly at: https://www.fhwa.dot.gov/pavement/pub_details.cfm?id=1153.

Responsible Use of Polyphosphoric Acid (PPA): Polyphosphoric acid (PPA) is a chemical modifier employed to improve high temperature rheological properties without adversely affecting low temperature rheological properties that has been used since the early 1970s. PPA has also been used as a binder modifier to extend the asphalt binder range between the high and low temperature performance limits of the specification. This report provides information to supplement existing publications communicating responsible use of Polyphosphoric Acid (PPA) in asphalt binder formulations. It can be accessed directly at: https://www.fhwa.dot.gov/pavement/asphalt/HIF_Polyphosphoric_Acid_Modification.pdf.

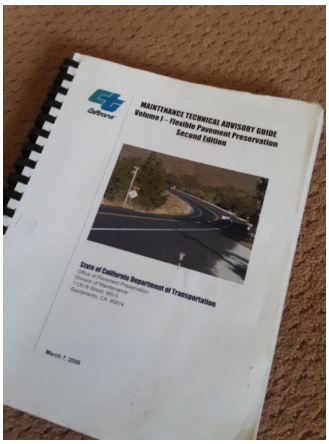
Adjustment of Asphalt Mix Design/Job Mix Formula to Satisfy Mechanical Test Properties: This report summarizes information related to practices and suggestions being used by industry for asphalt mixture adjustments to get acceptable test results to meet Balanced Mix Design (BMD) specifications set forth by agencies. This was achieved through interviews with eight individuals with vast experience on BMD. General considerations for making adjustments and for improving rutting or cracking resistance are summarized. You can access directly at: https://scholarworks.unr.edu/handle/11714/8436

FHWA has also published a Tech Brief on the use of ***recycled concrete aggregate (RCA)*** in concrete paving mixtures, and identified considerations for its use in highway infrastructure. The document is intended for highway agencies and contractors / engineers. It outlines case studies from Colorado, Georgia, and California. The document is available at: Use of Recycled Concrete Aggregate in Concrete Paving Mixtures tech brief (dot.gov)

For more information contact Chu Wei at: chu.wei@dot.gov

MTAG Update

By Roger Smith, CP2 Center



Since its first publication in 2003, the **Caltrans Maintenance Technical Advisory Guide (MTAG)** has been a go-to reference for all things pavement maintenance. It's often referred to as the pavement maintenance 'Bible'!

It used to be a 2-Volume reference - Volume 1 for Flexible (Asphalt) Pavement Preservation, and Volume 2 addressed Rigid (PCC) Pavement Preservation. The Volume 2 was incorporated into the Caltrans Concrete Pavement Guide in 2015.

Volume 1 (Asphalt Pavement) covers topics such as the purpose of pavement preservation, strategy selection, and coverage of the specifics of 10 commonly used strategies, including crack sealing, patching, fog seals, chip seals, slurry & and micro surfacing and thin overlays and even in-place recycling.

It's a very comprehensive Guide!! But updates are needed. It's last update was in 2008.

So an updating effort will begin in 2023, with the CP2 Center playing a major role under one of their contract tasks in providing support work for Caltrans.
In the meantime, you can find the current MTAG at:
https://dot.ca.gov/programs/maintenance/pavement/mtag

Coming Events – Mark Your Calendar!

By Roger Smith, CP2 Center

(If logos are added, please keep them small and put them at the beginning of each item. Thanks. Roger)

CCPIC / U.C. Berkeley Technology Transfer Pavement Classes (online)
These classes were developed in partnership with the City and County Pavement Improvement Center (CCPIC) and funded by California Senate Bill 1, The *Road Repair and Accountability Act of 2017*.
Classes currently open for enrollment are:

- **Pavement Life Cycle Cost Analysis: The Basics (CCB-01) September 6-7**
- **Asphalt Pavement Preservation Treatments, Materials, Construction and Quality Control, November 27-30**

Information is at: https://www.techtransfer.berkeley.edu/

Asphalt Pavement Alliance Training (online)
The Asphalt Pavement Alliance (APA) and its partners offer webinars throughout the year on a variety of topics related to the asphalt industry. With knowledgeable presenters from around the county, these webinars are dedicated to teaching best practices for testing, design, and application of asphalt delivered to you in the comfort of your home or office. For more information got to: www.driveasphalt.org/events/webinars

NCPP National Conference September 18-21 (Indianapolis)
The National Conference of the National Center For Pavement Preservation (NCPP) will offer technical speakers, educational events, equipment demos and networking opportunities on all aspects of pavement maintenance and preservation. For more info go to:
https://nationalpavement2023.org/wp-content/uploads/2023/01/2023-NPPC-Brochure.pdf

MSA Conference & Equipment Show September 25-29 (Fantasy Springs, CA)
The 53rd Maintenance Superintendents Association (MSA) Conference & Equipment Show will be hosted by MSA's Inland Empire Chapter in Fantasy Springs, CA, near Indio. This popular event will offer training sessions, an equipment show, and lots of networking opportunities.
For information got to: www.mainsupt.com

Nevada LTAP Center Classes Various Dates (Online)
The Nevada center for the Local Technical Assistance Program (NV-LTAP) regularly offers classes on a variety of pavement maintenance topics.
For more information go to: https://nvltap.com/

The Asphalt Institute and NAPA Webinars (Online)
The Asphalt Institute offers national training on pavement design, asphalt binders, nix design and asphalt construction. They now offer an online Paving Inspector Certification (PIC) program. For more information on The Asphalt Institute go to;
http://www.asphaltinstitute.org/training/seminars/

The National Asphalt Pavement Association (NAPA) offers webinars on various asphalt pavement topics. For current listings go to:
https://www.asphaltpavement.org/programs/napa-webinars

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

Caltrans established the California Pavement Preservation (CP^2 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. Rukesh Maharjan 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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