



CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

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Introducing the CP²C 'Pavement Preservation Academy'

By Ding Cheng and Gary Hicks, CP² Center



Thin Asphalt Overlay

As part of the Senate Bill 1 (SB-1) funding through the CSU Transportation Consortium headed up by Mineta Transportation Institute (MTI) in San Jose State University, the California Pavement Center (CP²C) is pleased to announce a certificate program in pavement preservation, via The Pavement Preservation Academy. The purpose of the program is to help local agencies improve the design and construction of pavement preservation treatments.

The effort began in 2018 with the development of technical manuals for chip seals, slurry surfacing, Cape seals, and thin hot mix overlays. The four manuals can be found with the following links:

<https://transweb.sjsu.edu/research/1845A-Chip-Seal-Manual>

<https://transweb.sjsu.edu/research/1845B-Slurry-Surfacing-Manual>

<https://transweb.sjsu.edu/research/1845C-Cape-Seal-Manual>

<https://transweb.sjsu.edu/research/1906-Manual-Thin-Asphalt-Overlay>

The certificate program will consist of four 3-hour modules, and the student must pass an exam to gain a certificate. Initially the courses will be offered once per year. It is expected the first course will be offered in March 2021. Each of the four modules will cover the following topics:

- Overview of the treatment
- Project selection
- Materials and design
- Specifications
- Construction
- Safety
- Quality Assurance
- Trouble shooting
- Other resources available

The Academy is designed to empower local agency staff and contractors, through training,

to choose the right treatment, at the right time, to optimize preventative maintenance funds. Most local agencies defer road maintenance over many years, and there are thousands of miles of public roads that are currently in poor condition. With new state funding available for maintenance and construction projects, proper preventative maintenance is an issue of paramount importance. Information on registration can be found on the Center website at <https://www.csuchico.edu/cp2c/educational-opportunities/pp-academy.shtml> Treatments that can preserve pavements and defer the need for and costs of road reconstruction are very important. Here's a look at the treatments that the Academy will cover.

Chip Seals

Chip seal, also known as seal coat, is one of several valuable preservation treatments for roads, which usually receive light to medium traffic volumes. It has also

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performed well on higher-volume roadways, and is usually placed over existing hot mix asphalt (HMA) pavement. Chip seals are placed by spraying the pavement with a binder - either an asphalt emulsion or a hot applied binder - from a distributor truck, and then immediately applying a uniform application of a



Chip seal operation

cover aggregate (chips or screenings) using a self-propelled chip spreader. The aggregate is rolled as soon as possible to ensure embedment and adhesion of the aggregate to the fresh binder. Our new chip seal manual presents the best practices for design and construction of

variations such as 'scrub seals' and Geosynthetic Reinforced Chip Seals (GRCS). It further includes guides for troubleshooting construction problems and guide specifications for both emulsion and hot applied chip seals.

Slurry Surfacing

Slurry surfacing, as a pavement preservation treatment, includes both slurry seals and microsurfacing.

Slurry seals were first developed in the 1930s, and they proved to be a promising strategy for maintaining road surfaces. By the 1960s, with improved emulsions, and continuous flow slurry machines, real interest was shown in using slurry seal across a wide range of applications. Currently, slurry seals are used for public roads, highways, airport runways, parking lots, and a multitude of other surfacing projects throughout the world.

Microsurfacing was first developed in the 1960s in Germany and is an improved version of a slurry seal. Microsurfacing uses a more complex form of slurry surfacing involving special "engineered" polymer-modified Quick Setting (QS) asphalt emulsion, as well as mineral fillers, such as cement. It can be placed thicker than slurry seal and is often used for wheelpath rut filling. Microsurfacing is now widely used in the United States, and in California in particular.

Slurry Surfacing provides an economical means for maintaining and improving the functional condition of an existing pavement. It can be used repeatedly or in conjunction with other preventative treatments to slow deterioration

or correct isolated pavement defects. This manual highlights the best practices for the design, specifications, and construction for successful slurry surfacing. Most needed information about slurry surfacing can be easily used by both local agencies and industry.

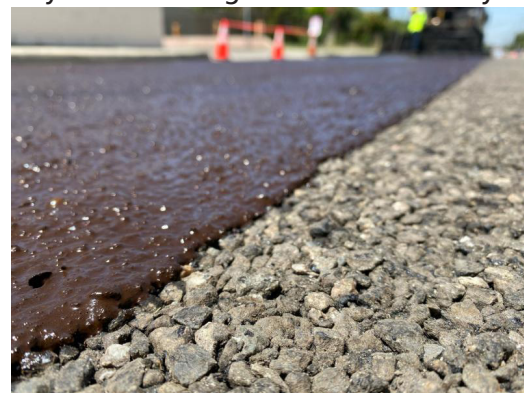


Slurry seal operation

Cape Seals

Cape seals originated in Cape Province of South Africa, near Cape Town, hence the name Cape. They consist of a single chip seal, which is then covered by a slurry surfacing, either a slurry seal or a microsurfacing. In the past several years, they have evolved into maintenance treatments that can be successfully used on both low- and high-volume roads. The popularity of cape seals is a direct result of their low initial costs in comparison to HMA overlays. Currently, with improved binders and equipment, considerable interest has been shown for using cape seals in a wide range of applications, such as on public roads, highways, local streets, and a multitude of other surfacing needs throughout the world.

This manual presents the best practices for the design, specifications, and construction for successful Cape seal projects, and can be easily used by both local agencies and industry.



Completed Cape seal

Thin Asphalt Overlays

All roads suffer from normal wear and tear on a daily basis. As a result, preservation treatments are regularly required to maintain these roads to meet the public's travel needs. Thin asphalt overlays are one of many preservation treatments for roads that receive light to medium traffic volumes, and sometimes heavy traffic volumes. Thin asphalt overlays are usually placed over existing HMA pavement by placing a new HMA layer from 1/2 inch to 1-1/2 inches in thickness, using a conventional self-propelled asphalt paving machine. The thin HMA is rolled as soon as possible to ensure compaction of the mix for its longevity. The new manual's authors have developed engineering guidance from project inception through troubleshooting construction problems. The key focus is achieving best practices for the design, specifications, and construction of thin asphalt overlays in the State of California. The information in this manual can be easily used by both local agencies and industry. In California, the two main sources of specifications are Caltrans or the 'Greenbook', which are both referenced in the new Thin Asphalt Overlay manual.



Thin Hot mix asphalt overlay

Instructors and More Information

The instructors for the four modules will be recognized names in the field, including:

- Gary Hicks - Introduction and chip seals
- Leros Lane - Slurry surfacing
- Ding Cheng - Cape seals
- Erik Updyke - Thin asphalt overlays

For more information, please contact Dr. Ding Cheng, the CP2 Center Director at dxcheng@csuchico.edu.



Winter Pavement Maintenance Tips

By Roger Smith, CP2 Center



Fall and winter bring wet weather to California, in many areas that's after months of no rain. In addition to the initial 'first rain' slick pavement, street managers must be aware of several other conditions that will likely pose challenges – both to safety and to structural conditions on the pavement. Let's look at some of the most common ones:

Slick pavement

Pavements serving higher speed traffic (say greater than 25 mph) must always offer adequate friction - especially on curves and around controlled intersections. Pavement friction can be expressed as a Skid Number obtained with a skid testing machine, such as those used by Caltrans, or a smaller portable skid tester. Pavement with low friction usually exhibits flushing of asphalt to the surface. While this pavement may serve well in dry weather,



Slick 'bleeding' pavement

it can offer a very dangerous condition in wet weather – for motorcycles as well as cars and trucks trying to stop as the light changes to red. So it's important to have these slick pavement areas on the radar for fixing before the wet weather hits. What are some 'fixes' that might be considered?

Probably the simplest is just roughening up the pavement surface with a milling machine – either a large milling machine (via a contractor) or maybe an 'in-house' treatment using your agency's smaller milling machine, usually mounted on a front end loader. Often just treating the slick wheel path areas is sufficient and saves the expense of re-striping. Both wheel paths should be treated so as not to create differential skid resistance. This treatment is usually just a stop-gap effort to get you through the winter until doing a proper fix when weather permits.

Potholes

It's a given that with wet weather come potholes. Localized areas with severe deterioration that hung together for the summer, will now start to come apart and lose

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chunks of material, leaving potholes. Of course, these are immediate hazards, especially to motorcycles, scooters and bicycles. They require a fast response, so it's important that your agency have a supply of a 'quick-patch' pothole product. These products can be purchased in bulk and stockpiled, or they also come in bags, which can even be purchased at home supply stores. Some agencies fill 5-gallon pails from a stockpile and keep a few in every truck so every crew can be prepared. These 'cold' products remain workable and can simply be dumped into the pothole (even a wet one!) and hand tamped, or given a quick wheel roll – usually without a lane closure. But in heavier traffic areas, cones and a shadow truck may be necessary for worker safety. Quick-patch products are a stop-gap measure until proper HMA patches can be made - usually in the spring. They work best in smaller potholes – up to about 2 feet square.



Quick Patch Mix

Also, at this time of year, it's important to step up your 'report-a-pothole' campaign to help you ride herd on the assault, and to foster good public relations with the community. (I recently reported a dangerous pothole, and it was filled by an agency crew the same day! ...pretty impressive!) Bumper stickers on your agency's vehicles are a good means of promoting your program.

Crack Sealing

Crack sealing is the first line of defense to prevent rain water from getting into the base and subgrade and weakening those supporting materials. So sealing of cracks is best done in the fall, before wet weather hits. If you are doing crack sealing late in the year, be sure to consult your supplier of material for advice on the proper grade of sealant for the climate conditions. Only hot sealants should be used in late-season work, colder weather, and softer grades of sealant should be used.

Running the melter 'kettle' at the high end of the recommended temperature range for the sealant grade will also help. (Emulsion-based (cold) crack sealers are water based - relying on evaporation to cure - and are therefore should only be used in warmer weather.) Preheating and drying the crack with a 'hot air lance' is recommended to promote bonding of the



Hot air lance use (Crafco)

sealant. And in more severe winter areas, linear cracks should be pre-routed. It's also important to be aware that wide over-bands or smearing of sealant on the surface can reduce pavement friction and create a wet weather slick, hazardous condition.

Hot Mix Paving

In colder areas it's not the time for paving, but if late season hot mix asphalt (HMA) paving must be done, there are some tricks that can help you. Here's a few: ask the plant to run a bit hotter; tarp the haul trucks; pave a thicker lift (one 3"-inch lift vs. two 1 ½ -inch lifts); slow the paver down and keep the roller very close to the paving machine in order to 'roll while it's hot'.

Freezing of Products

Be aware that emulsion products (e.g. tack coat material) are water based, and if sitting in a tank they can freeze. You'll have to drain those tanks for the winter or store them in a heated area.

Striping

On wet pavement, older faded striping becomes less visible – especially at night. So it's a good idea to identify these areas and include striping restoration as part of your pre-winter safety improvements.

Winter and wet weather can take its toll on our pavements, but we can minimize the effects with proper preparation and a quick response program for minimizing the safety hazards that the season brings.

For more information contact Roger Smith at: rdsmith2009@gmail.com

Caltrans I-5 Rehab Project Targets 40-year Life

By Robert Humer, The Asphalt Institute

Back in 1996 Caltrans embarked on a policy of designing longer-life pavement projects, aiming for at least 40 years of service life. With the Long Beach Freeway (I-710) mentioned as a high truck traffic trial candidate, in 1998 a team of Caltrans, Industry and Academia was formed to guide the project through all phases. The first I-710 Long-life project ran from Pacific Coast Highway (PCH) north to the I-405 Freeway. Full-depth asphalt (FDAC) replaced the old concrete at the underpasses to maintain the required clearance, while Crack, Seal & Overlay (CS&O) with hot mix asphalt (HMA) and paving fabric interlayer was the design for the majority of the lane miles. This initial project showcased its many benefits of: continued use by traffic with the least amount of disruption during construction, a much shortened construction phase limited to only eight 55-hour weekends, a high quality smooth ride in extreme contrast to the dangerous ride situation prior to the renovation, and a pavement still in excellent condition after 20 years of heavy traffic.



I-710 Long-Life Project after over 20 years of service

The success of this first Caltrans Long-life project, was followed by three more Long-life projects on I-710 of similar design in the following years. In the years between 2010 and 2016, an additional three Long-life pavement renovation projects were conducted; two on I-5 in District 2 (the Red Bluff and the Weed projects), and one in District 4 on I-80 between San Francisco and Sacramento, in Solano County.

Presently an eighth Caltrans Long-life pavement renovation project is underway on I-5 starting in downtown Sacramento and running 15.3 miles south. Also this project is using FDAC replacement under the overpasses and CS&O of the old concrete pavement on most of the project's length. This project has a 40-year design life, will use 600,000 Tons of Hot-Mix and cost \$275 Million when all is done. Half the tonnage was paved in 2020, with the remaining 300,000 tons to be placed in the coming year.

The structural designs were conducted by UC Berkeley/UC Davis using a Mechanistic-Empirical (M-E) design method for the FDAC sections and a Finite Element (FE) program for the CS&O sections. Contrary to what many believe, the Long-life/Perpetual pavement design concept is not "just a thicker pavement", but a smarter structural design where each layer is specifically designed for the stresses and strains it will experience in service. Important for the Long-life/Perpetual Pavement designs is that each of the layers do not exceed their fatigue endurance limit. The fatigue endurance limit is divined as the ratio of the occurring stress to the maximum stress (σ/σ_{max}), at which fatigue damage will never occur. To comply with this requirement, the mix designs involve performance tests, using AMPT, Bending Beam Fatigue, SCB (a cracking test), and the Hamburg Wheel Tracking Tester (HWTT). The specification requirements were set by the University of California Pavement Research Center (UC PRC), based on extensive research on locally available materials, and taking into consideration the variability in the specified performance tests. Up to 25% RAP is permitted in certain layers. Therefore, the project specifications do not dictate the binder PG grade to be used, leaving the choice to the Contractors to select the binders that result in passing mix designs.

At the CS&O sections a 2 inch leveling course is followed by paving fabric and 6 inches of HMA. A final one inch lift of open-graded asphalt rubber will be the final surface. The FDAC sections have a 3" "rich bottom" layer with 9" of different asphalt layers on top.

Two contractors, Granite Construction and Teichert Aggregates have split the work with Granite taking on the southbound lanes



Night paving on I-5

and Teichert addressing the northbound lanes. Much of the work was done at night and/or involved weekend closures of some lanes and ramps.

Based on the positive experience with these Long-life/Perpetual Pavement projects, Caltrans and Industry have developed the expertise and confidence for such future projects. When looking at many of the urban freeways in California with deteriorating concrete

pavements and high levels of daily traffic, there is definitely a future for such Long-life/Perpetual Pavement projects in our State.

For more info contact Robert Humer at: rhumer@asphaltinstitute.org



Caltrans and Industry Partnering for Worker Safety

By Kee Foo, Caltrans, and Tony Limas, Granite Construction Co.



With the increased use of reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS) in hot mix asphalt (HMA) in California, the number of trichloroethylene (TCE) solvent extraction tests, required by the Caltrans specifications, continued to rise. The increased use of TCE continues to be a major concern to Caltrans and their industry partners. This come on the heels of a February 2020 EPA finding that targets TCE as a source of unreasonable environmental risk for both water quality and toxic air emissions.



Asphalt Testing Lab Work

Trichloroethylene (TCE) has a long history of use as an industrial solvent and degreaser in many applications. TCE has also been studied and evaluated at the Federal and State levels for environmental and occupational risk and health effects. TCE is a documented human carcinogen and is listed as a priority toxic chemical posing significant environmental impacts and risk. Human health impacts for kidneys and liver cancer have been established resulting from exposure to TCE. Given the voluminous evidence and data related to TCE, Caltrans and their industry partners recognized the need for asphalt pavement industry to take decisive action to eliminate or significantly reduce the use of TCE within the asphalt pavement industry.

Similar to other Hot Mix Asphalt (HMA) constituents, RAP must be characterized using laboratory tests that measure properties such as asphalt content, gradation, specific gravity and other properties deemed essential to the HMA mix design process.

Being aware of the significant health, safety and environmental concerns, many agencies are moving away from the use of solvent extraction tests (AASHTO T164) as the sole methodology to measure the asphalt content in RAP. Instead, agencies are leveraging the use of the ignition oven (AASHTO T308) as a process control tool during the production of RAP stockpiles.

To accurately measure the asphalt content of RAP for use in HMA mix designs, a limited number of RAP samples are tested using the solvent extraction methodology. In that process paired ignition oven tests can be performed to establish a correlation factor between the solvent extractions and the ignition oven. As noted earlier, the ignition oven correlation factor can then be used to monitor the production of RAP stockpiles. This process significantly reduces the laboratory technician's exposure to TCE. If RAP is added to an existing RAP stockpile, additional ignition oven tests can be performed to verify that new RAP has a binder content that falls within a specified tolerance of the ignition oven RAP content reported in the HMA mix design.

These new requirements are a significant improvement over the past requirements. For example, under the previous specification requirements the contractor was required to perform three solvent extractions on the RAP stockpile used for the mix design. (This requirement remains unchanged.) However, if the contractor were to add an additional 60,000-tons to the RAP stockpile prior to or during HMA production, they were required to perform an additional 60 solvent extractions - for a total of 63 solvent extractions. With the new requirements the number of solvent extractions is reduced to 3. Worth noting is that, where necessary, the solvent extraction tests are typically performed by commercial asphalt binder testing labs having state-of-the-art equipment that significantly reduces the workers exposure to TCE.

The 'team effort' approach undertaken to significantly improve worker health and safety is a testament to what can be accomplished when Caltrans and their industry partners are committed to a common goal for the good of all concerned.

For more information contact Tony Limas at tony.limas@gcinc.com or Kee Foo at kee.foo@dot.ca.gov



Laboratory Ignition Oven

CIR Webinar Highlights

The Pavement Preservation and Recycling Alliance (PPRA) in conjunction with FHWA has been offering free monthly pavement preservation webinars since February 2020 for anyone interested in keeping good roads good. The September 2020 topic was on Cold In-place Recycling (CIR) and Cold Central Pavement Recycling (CCPR). The seminar was given by Jason Wielinski of the Heritage Group. Topics covered during the presentation included: introduction to the CIR and CCPR processes, project selection and construction, mix design, and review of some example projects.

The CIR process consists of in-place recycling using either a single milling unit or a 'train' of equipment, adding a binder, placing the recycled mix, rolling, and curing of the compacted mix.

The CCPR process is similar except the pavement millings are moved to a central plant, mixed, and then transported back to the job site, placed, rolled and cured. Cold recycling materials include the recycled asphalt pavement (millings), recycling agents (engineered emulsions or foamed asphalt), and other mix additives such as Portland cement, lime, or corrective aggregates, and water. Cold recycled mixes require a wearing surface because of higher voids than HMA once the mix has been cured. The wearing surface can be HMA or surface treatments such as chip seals or Cape seals depending on the traffic volume.

CIR candidates include pavements exhibiting raveling, reflective cracking, edge or block cracking, potholes, top down cracking, and stripping if in localized areas. Pavements with widespread subgrade showing fatigue cracking or rutting or with poor drainage are not good candidates for CIR. The existing pavement should receive an accurate assessment including the taking of cores, checking drainage and base and subgrade conditions, and review construction records.

Mix design was also covered, including

requirements for taking representative samples throughout the project, and laboratory testing such as Marshall Stability, adhesion tests for moisture damage, and strength development over time. The amount and type of new binder and any recycling agent, and the amount of new mineral additive are also determined.

The webinar's segment on the construction process included discussions on weather considerations, quality control (particularly gradations and density) and enforcing specifications.

Keys for successful projects include:

- Right road, right time, and right treatment or project selection
- Using an 'engineering process', including project scoping, pavement design, selecting the correct recycling agent, mix design, and quality control

If done correctly, an agency can save money, save time, extend the life of the pavement, improve ride, reduce carbon emissions and improve sustainability.

Other resources provided via the webinar included:

1. ARRA best practices guide for CIR https://cdn.ymaws.com/www.arra.org/resource/resmgr/Guidelines/ARRA_CR101_11-02-17.pdf
2. ARRA best practices guides for CCPR https://cdn.ymaws.com/www.arra.org/resource/resmgr/Guidelines/ARRA_CR102_11-02-17.pdf
3. PPRA, www.roadresource.org
4. FHWA check list and TechBrief on Overview of Project Selection Guidelines for CIR and CCPR <https://www.fhwa.dot.gov/pavement/preservation/resources.cfm> <https://www.fhwa.dot.gov/pavement/asphalt/pubs/hif17042.pdf>

For more information please contact Jason Dietz at jason.dietz@dot.gov or Jason Wielinski at [Jason Wielinski@hrlab.com](mailto:Wielinski@hrlab.com)



Figure 1. Milling Operation



Figure 2. Windrow Paving of CIR Mix

AASHTO ETF Update

By Colin Franco (RI DOT) and R. Gary Hicks (CP2 Center)

The American Association of State Highway and Transportation Officials (AASHTO) TSP2-Emulsion Task Force (ETF) continues to work on

developing material specifications, design practices, quality assurance (QA) specifications and construction guides for emulsion

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**GENERAL
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preservation treatments. Many of the materials specifications and design practices have already been developed and published by AASHTO. The construction guides for chip seals, microsurfacing, and fog seals developed under NCHRP project 14-37 were submitted to the AASHTO Committee on Material and Pavements TS5b (COMP TS 5b) for balloting in November 2020. Chairman Larry Ilg (Oregon DOT) passed these guides with some requested editorial changes. Other guides will be developed as a part of new NCHRP projects 14-43 (Cold Central Plant Recycling and Cold In-Place Recycling) to be performed by NCAT, and 14-44 (Scrub Seals, Slurry Seals, and Tack Coats) being performed by the University of Arkansas. In addition, two new initiatives were discussed which included the use of rejuvenators in emulsions and messaging and implementation of the new AASHTO standards and guides. All the activities (completed or planned) are summarized in Table 1.

NCHRP project 9-63 Development of Performance Graded Specifications for Emulsified Asphalts continues work to develop performance graded (PG) specifications for asphalt emulsions. This will involve developing a recovery method for emulsions and then a suite of tests which relate to the performance of emulsion treatments like chip seals, slurry surfacings and more. This project is now underway by the Asphalt Institute (AI) and NCAT under the leadership of Mike Anderson of the AI. A Phase 1 report was submitted which lays out the work plan for the Phase 2 effort. Issues being addressed in the phase 2 effort include the recovery method for the asphalt residue, the low and intermediate properties for the residue, which relate to performance, and the effects of polymer in the binder. The project is expected to be completed in 2022.

Another ETF effort underway was the development of QA guides for chip seals and slurry surfacings. These include sections on quality control, agency acceptance and independent assurance. These were submitted to AASHTO COMP TS 5c chairman, Curt Turgeon (Minnesota DOT) for

balloting in November 2020 and were approved with some editorial changes. QA guides will also need to be developed for the other treatments in the future. It is not clear who will develop these guides at this time (NCHRP or the ETF).

The NCHRP project [20-44(26)] Implementing Guide Specifications for the Construction of Chip Seals and Microsurfacing, is designed to implement and facilitate the use of the new AASHTO specifications and guides. This effort started in September 2020 with tasks for developing the message as to why these specifications and guides should be used, outreach to state and local agencies, training, and construction of demonstration projects. The contract is being performed under the leadership of Larry Galehouse of the National Center For Pavement Preservation (NCP), and the AASHTO ETF will provide technical support in the form of projects to be constructed using the new specifications and guides. If any state or local agency is interested in participating in the construction of a demonstration project, please contact Larry Galehouse at galehou3@msu.edu. Training and assistance with project specification development will be made available.

Finally, the ETF is developing best practices documents for emulsified asphalt chip seals and slurry surfacings (slurry seals and microsurfacing). It is expected that the final drafts of these documents will be available by the end of 2020 or early 2021, COVID-dependent ! When completed, they will be posted on the NCP website and will be used as a primer for NCHRP project 20-44(26).

All the presentations and the minutes of the

Table 1. Status of AASHTO Guides *Continued, next page*

Emulsion Treatments	Material M	Design Practices R	Construction Guide Specs	Quality Assurance Guide Specs
Chip Seal	MP27-16	PP82-16	Approved	Approved
Micro Surfacing	MP28-17	PP83-16	Approved	Approved
Fog Seal	MP33-17	PP88-17	Approved	
Asphalt Rejuvenators				
Bonded Surface Treatments (Nova Chip)	MP44-20	PP100-20		
Cold Recycled Mixtures	MP31-17	PP88-17		
Foam Asphalt Stabilization		PP38-18		
Sand Seal	MP34-18	PP90-18		
Scrub Seal	MP43-20	PP91-18		
Slurry Seal	MP32-17	PP87-17		Approved
Tack Coat	MP36-18	PP93-18		
Emulsified Asphalts	Material M			
Emulsified Asphalt	M140-16			
Cationic Emulsified Asphalt	M208-16			
Polymer-Modified Cationic Emulsified Asphalt	M316-16			

meeting can be found on the ETF website at:

<http://tsp2-etf.org/>

Notes: 1) Construction Guide Specifications and Quality Assurance Standards shown as Approved are in the AASHTO publication process.

2) NCHRP project 9-63, "Development of Performance Graded Specifications for Emulsified Asphalts" is ongoing and being conducted by AI (M. Anderson) and NCAT.

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Recycled Plastic In Asphalt

From CalAPA



Type 1 Plastic Bottles

Incorporating recycled plastic into asphalt pavements has received a fair amount of attention in California this year, which makes two new reports on the topic recently released by the National Asphalt Pavement Association (NAPA) especially timely.

The first report, titled Recycled Plastics in Asphalt Part A: State of the Knowledge, seeks to synthesize the myriad of studies and pilot projects that have been done in this area so far and identify important lessons learned as well as gaps in the knowledge. The report was released simultaneously with a companion report, Recycled Plastics in Asphalt Part B: Literature Review.

The report notes the asphalt industry's long history with recycling in general, and examines the industry's experience with recycling, including the use of Reclaimed Asphalt Pavement (RAP) and Rubberized Hot Mix Asphalt (RHMA), which is widely used in California.

"A prevailing theme," the report notes, "is that logical decisions backed by engineering, science, technology and economics have led to successful outcomes, but that recycling for the sake of recycling may not be what is best for the longevity of our asphalt pavements or even be the most sustainable option."

The report recommends additional research be conducted, including on the source and type of plastics and the process (wet vs. dry) for introducing recycled plastics into asphalt pavement, and a better understanding of the health, safety and environmental impacts of heating recycled plastic as part of the asphalt production process. Pavement performance and the future recycling of pavements with plastic content also must also be examined, the report recommends. The reports can be downloaded in PDF format from the NAPA website [HERE](#). CalAPA member Brenda Mooney with Valero's Benicia Refinery is one of the subject-matter experts acknowledged in assisting with the report.

A bill to promote the use of recycled plastic in

asphalt, SB1238, was introduced in the Legislature earlier this year by state Sen. Ben Hueso, a Democrat who represents parts of San Diego and Imperial counties. It passed the Senate but never made it out of the Assembly before the legislative year ended.

Caltrans, meanwhile, oversaw construction of a test section of pavement utilizing recycled plastic in asphalt in Northern California. The 1,000-foot section put down in July on Highway 162 in Oroville, a semi-rural community about 70 miles north of Sacramento, is being evaluated by the department. A previous article on that project is [HERE](#). The \$3.2 million paving project covers a stretch of Highway 162 between the Feather River and Christian Avenue in Oroville. Lamon Construction Company, Inc. of Yuba City was the prime contractor.

The pilot project represented the first test on the state highway system in California, although there have been tests conducted on local routes, some of which have attracted a flurry of media attention.

"This pilot project underscores the department's commitment to embracing innovative and cost-effective technologies while advancing sustainability and environmental protection efforts," Caltrans Director Toks Omishakin said in a news release.

Using new technology developed by TechniSoil Industrial of Redding, Calif., a recycling train of equipment ground up the top 3 inches of pavement and then mixed the grindings with a liquid plastic polymer binder, which comes from a high amount of recycled, single-use bottles. The new asphalt material is then placed on the top surface of the roadway, eliminating the need for trucks to bring in outside material for a paving operation. By eliminating the need to haul asphalt from the outside, Caltrans said, this process may significantly cut greenhouse gas emissions.

"We're excited about introducing a new sustainable technology and helping pave the way for utilization of

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recycled plastics throughout the state," Caltrans District 3 Director Amarjeet Benipal said in the Caltrans press release. "This process is better for the environment because it keeps plastic bottles out of landfills and helps reduce greenhouse gas emissions and reliance on fossil fuels." Benipal was the head of the Caltrans Division of Pavements before taking over the regional office that covers 11 Northern California counties, including Sacramento.

Tom Pyle, the chief of the Office of Asphalt Pavement for Caltrans, has been closely monitoring various plastic-in-asphalt applications and research, and was involved in the pilot project in Oroville. "The plasticized pavement is being investigated to understand

the construction, material and environmental characteristics that could make it a specialized tool in the department's options to repair pavements," according to Pyle.

Asphalt is the world's most recycled product, and the asphalt industry has long advocated for innovative solutions to make pavements more sustainable. Notably, asphalt pavements made with recycled rubber have been in widespread use in California and have helped divert millions of used vehicle tires from California landfills.

For more information go to the California Asphalt Pavement Association (CalAPA) website: www.calapa.net



Slurry/Microsurfacing: Materials & Mix Design

By Sallie Houston (VSS International) and Gary Hicks (CP2 Center)



Slurry Machine

The Pavement Preservation and Recycling Alliance (PPRA) in conjunction with the Federal Highway Administration (FHWA) have been offering free monthly webinars since February 2020 for anyone one keeping good roads good. The 'Movement 2020' topic was on Slurry Systems: Mix Design and Materials Testing, and was given by Sallie Houston (Technical Manager of VSSI) on November 19, 2020. Topics covered included the following: Introduction to Slurry and Micro Surfacing systems, Design Considerations, Materials and Mix Design. A recording of all the webinar the presentations can be found at: <https://roadresource.org/webinars>.

Slurry and micro surfacing systems consist of thin pavement systems, applied at ambient temperatures with generally no compaction, using advance materials, and zero emission products. They are not a fix for structural problems in the existing pavement, placement in the rain or cold temperatures, or extremely deteriorated pavements. Much of the information presented came from the following ISSA Recommended Performance Guidelines:

- Emulsified Asphalt Slurry Seal A-105 https://cdn.ymaws.com/www.slurry.org/resource/resmgr/files/guidelines-_new_versions/a105_revision_for_publicatio.pdf
- Polymer-Modified Emulsified Asphalt Slurry Seal A-115 https://cdn.ymaws.com/www.slurry.org/resource/resmgr/files/guidelines-_new_versions/a115_draft_26august2020.pdf

- Micro Surfacing A-143 https://cdn.ymaws.com/www.slurry.org/resource/resmgr/files/guidelines-_new_versions/A143_Revision_for_Publicatio.pdf
- Inspectors manual for slurry systems, 2010 which is available from ISSA at: www.slurry.org

Slurry and micro systems are 5 component systems consisting of aggregate, emulsified asphalt, water, cement or other mineral fillers (optional), and chemical additives as required. There are three gradations of aggregate used for slurry seals (Types I, II, and III) and two used for micro surfacing (Types II and II). The purpose of the aggregate is to provide structure and wearing surface. The asphalt emulsion binder used for slurry seals can be 'neat' or polymer modified, whereas the emulsion used for microsurfacing is polymer modified. The purpose of the emulsion is to bind the aggregate, provided waterproofing and color. Water is added to the mixture for mixing, lubrication and handling. Fillers are added for to provide consistency, strength and durability and to aid with curing. Additives are used to control break and aid with adhesion.

Table 1 provides a good summary of the differences between slurry seals and microsurfacing in terms of the asphalt emulsions used, the break of the emulsion, mix stiffness and equipment needed, and purpose of the application.

Table 1. Differences between Slurry Seals and Microsurfacing

Difference In:	Slurry Seal	Microsurfacing
Asphalt Emulsion	Polymer optional; Slow set, quick set; Anionic, cationic	Always polymer modified; always cationic quick set
Additives/ Break	More dependent on weather	Chemical break via additives
Mix Stiffness/ Equipment	More workable mix; drag box	Stiffer mix; double auger box; secondary strike-off
Aggregate	Type I, II, III	Type II and III only; higher S.E. (cleaner); more durable
Application	Fill voids, seal ageing pavement, durable wearing course, aesthetics	Same, plus higher traffic, rut filling, cooler weather/night work, correct minor profile irregularities

Materials testing

With respect to testing asphalt emulsions, topics covered included what the tests mean, who should do the testing, which tests matter, and how to take samples. The tests on emulsions, their specifications and the purpose of the test were discussed. The field testing should be done by the contractor and agency and the importance of how to take a representative sample and labeling it was also discussed. Laboratories doing the testing should be certified labs. The tests for aggregates - including those done prior to the job and those done during the job (in the field) - were discussed. Normally aggregate gradation and sand equivalent are tested during the job. Also discussed, were the proper sampling techniques and some guidelines as to when to take additional samples in case problems arise.

Mix design

The steps for mix design include testing of the component materials, mixture testing and long term performance testing. The tests used

for mix designs for both slurry seals and micro surfacing along with the specification and the reason the test are performed were presented. Normally it takes about 1 week to perform a slurry seal design and longer for the micro surfacing design because of the additional testing required. Slurry system designs are performed in the lab at 77 °F and normal lab conditions. The design results are an indication that the system will work, that quality materials are used, and an indication of good mix performance in the field. Good contractors can make the system work in the field, but adjustments will have to be made as field conditions vary from the lab conditions used to develop the mix design.

Here are some helpful resources:

- FHWA checklists for slurry seals and micro surfacing material checks
<https://www.fhwa.dot.gov/pavement/preservation/2019checklists/hif19036.pdf>
<https://www.fhwa.dot.gov/pavement/preservation/2019checklists/hif19031.pdf>
- International Slurry Surfacing Association (ISSA) <https://www.slurry.org/>
- Pavement Preservation & Recycling Alliance (PPRA)
https://roadresource.org/treatment_resources/slurry_seal
https://roadresource.org/treatment_resources/micro_surfacing
- AASHTO Resource Accreditation Program
<https://www.aashtoresource.org/>

For more information on this presentation, please contact Sallie Houston of VSSI at: sallie.houston@slurry.com or Jason Dietz of FHWA Resource Center at: jason.dietz@dot.gov



NICC 18th Annual Concrete Conference

By Roger Smith, CP² Center

The 18th annual Nevada Infrastructure Concrete Conference (NICC) was held November 17-19 via the 'Remo' virtual conference platform. Over 200 people participated. The Pavements Session on Day 3 was hosted by Charles Stuart of the Southwest Concrete Pavement Association (SWCPA). Here's an overview of the topics covered in the session.

Optimizing Concrete Mix Design was covered by Tyler Ley, PhD, of Oklahoma State University. He presented his "tarantula curve" approach

for providing guidance on optimizing aggregate gradations to improve the overall performance of the concrete mix. Check it out at: www.tarantulacurve.com

Maturity Testing of concrete was covered by Jagan Gudimettla, with FHWA's Mobile Concrete Technology Center. With "maturity" being the product of time and temperature for concrete curing, comparison of field aging conditions to controlled aging of laboratory concrete cylinders can allow close

Continued, next page



NICC 2020

estimation of the strength development in a concrete pavement. On paving projects, maturity meters are placed in the fresh concrete pavement to record time and temperature and compute 'maturity'. The meter can be read manually, or the information can now be uploaded to the internet to allow remote monitoring and assessment of actual 'in-place' concrete strength. This technology takes a lot of the guess work out of when a pavement has reached adequate strength for opening to traffic. For more information contact Jagan at: Jagan.M.Gudimettla.CTR@dot.gov

Concrete Overlays in Missouri was the topic of John Donahue of the Missouri DOT. Missouri has extensive experience with overlays dating back to about the 1960's. A total of 21 overlay projects have been built, most on Interstates 44 and 35. Their modern era started around 1990

with thick, reinforced (JRCP) designs – one involving an 11" thick overlay and also an 8" thick design with a 1" thick hot mix asphalt (HMA) 'bond-breaker' interlayer. Most of their projects since have involved thinner (4" – 5") unreinforced, jointed overlays, with either a HMA bond-breaker layer, or a fabric interlayer. These projects typically involve pre-leveling local depressions of the old pavement, and also saw-cutting joints in the overlay to create smaller panels – say 6' by 6'. Many of these projects are now 15 – 20 years old and performing very well. A full report is available from Missouri DOT. For more information contact John Donahue at: john.donahue@modot.mo.gov

For information of this and future NICC Conferences contact Charles Stuart of SWCPA at: cstuart@swcpa.org



CCPIC Update

By John Harvey (UCPRC), Laura Melendy (UC Berkeley Tech Transfer), and Gary Hicks (CP2C)



The City and County Pavement Improvement Center (CCPIC) was officially formed in 2018 to work with local governments to increase pavement technical capability through timely, relevant, and practical support, training, outreach and research. The vision for the Center is to make local government-managed pavements last longer, cost less, and be more sustainable. The scope of the Center is to:

- Increase knowledge through training, peer-to-peer exchanges, and tech briefs
- Develop sample specifications and other resources,
- Establish a pavement engineering and management certificate program, and
- Serve as a resource, research and development center.

CCPIC is currently supported by SB-1 (fuel tax) funds provided to the University of California, and to the California State Universities. UC Davis, UC Berkeley, CSU Chico, CSU Long Beach, Cal Poly San Luis Obispo, and CSU San Jose (Mineta Transportation Institute) are all involved with CCPIC. The following provides an update on recent accomplishments and future plans of the CCPIC.

Training CCPIC plans to continue to offer an online option for all classes as this virtual

format has become so successful during the COVID period with high enrollment numbers. CCPIC can't offer a certificate until all courses are in place, which should be by next fall. A new 'group discount rate' on training courses is now available to agencies. When one person registers at full price, they will receive a discount code that they can share with up to 5 colleagues from the same agency to register for the same class at half-price. The Preservation Preservation Treatments class (CCC-02) was delivered November 13-16. The class was full and there was a substantial wait list. Because of the demand and interest, this class will be offered again in June.

Classes in 2021 currently open for enrollment include:

- CCA-02 Pavement Sustainability, February 8-10
- CCA-01 Introduction to Pavement Engineering and Management, March 8-11
- CCB-02 Pavement Management Systems and Preservation Strategies April 19-26, 2021
- CCC-02 Asphalt Pavement Preservation Treatments, Materials, Construction and Quality Assurance, June 21-24

Technical guidance and tools Efforts completed or underway include:

Continued, next page

- Existing projects LCCA spreadsheet - completed and posted
- Asphalt compaction specification - completed and posted
- Tack coat specification - near completion
- Concrete mix design specification - completed and posted
- Pavement environmental life cycle cost software - completed and posted Pavement Condition Index Tech Brief - expected completion November 2020
- Superpave for Local Government (SPLG) draft specification - draft completed

Resource Centers Recent activities for the 3 Resources Centers are listed below. These activities have been somewhat hampered by COVID 19, but all presentations can be found on the CCPIC website. If interested in a presentation, please let the CCPIC know.

- Central California: The meeting of the technical advisory committee of transportation agencies for Monterey County was postponed until next year (Jan-Feb-Mar)
- Southern California: The Public Works Officers Institute meeting is scheduled for La Jolla in March 2021 (postponed from fall

2020). CCPIC gave a presentation to the San Diego Building Better Roads committees, which are putting together 'technical briefs' covering many subjects.

- Northern California: There has been no activity since July 2020. But we will start reaching out to various organizations such as APWA, MSA, ASCE, CEAC and others

The CCPIC is also working to develop a contact list of people responsible for pavement in the cities and counties in the state. The list will be used to provide targeted information regarding upcoming training and other activities and gather input regarding technical information. We are looking for informal self-identification. To get on the list send an email to ccpic@ucdavis.edu with the subject "Pavement Contact Person" and provide your name and contact information, as well as a short note about what your pavement responsibilities are. The information will only be used for official CCPIC outreach activities.

For more information on the CCPIC activities please go to our website at: <http://www.ucprc.ucdavis.edu/ccpic/> or email us at ccpic@ucdavis.edu.



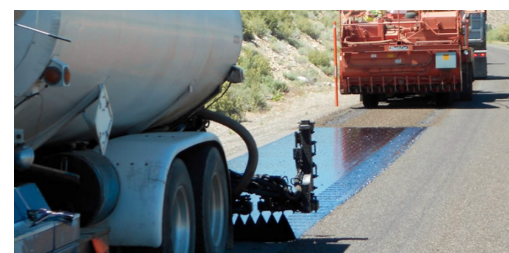
WRAPP Update

The Western Region Association For Pavement Preservation (WRAPP) reports that the 2020-21 conference has been cancelled due to COVID-19. Meanwhile WRAPP is doing training on pavement preservation treatments for Caltrans. The training session, in the second week of December, covered Chip Seals. In light of canceling the WRAPP Conference, WRAPP will be offering online training sessions for its membership in 2021. These sessions will cover all preservation processes, along with testing, inspection and specifications.

Although it's been fairly quiet as of late, WRAPP look forward to more online trainings for Caltrans and also local agencies. We are voting this week to extend the current WRAPP board for another year.

For more information contact Cesar Lara at: clara@ghirardelliassoc.com

By Cesar Lara, WRAPP President



Chip Seal Operation



Civil Engineering Materials Lab Upgrades at California State University, Chico

By Kun Zhang, Steffen Mehl, and Ding Cheng

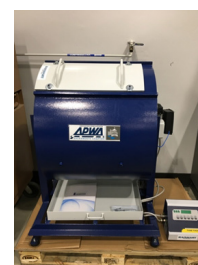
The Sacramento Chapter APWA Education Endowment Fund (EEF) sponsored new equipment installed in the Civil Engineering Materials Lab at California State University, Chico. The equipment included new Auto-SCB, LA Rattler, Coarse Aggregate Angularity, and Fine Aggregate Angularity testing devices. The Auto-SCB device can perform Semi-Circular Bend (SCB) test, Indirect Tensile Strength Test, and IDEAL-CT. Those are the most popular cracking performance tests used in the balanced performance design of asphalt mixtures for roads and highways. The LA Rattler device is used to test abrasion resistance of mineral aggregates. The Coarse and Fine Aggregates Angularity apparatuses are used to measure the uncompacted void contents of mineral aggregates, which help characterize the angularity and surface texture of aggregates. These devices will be used in civil engineering undergraduate laboratory courses, such as CIVL 212 – Civil Engineering Materials, CIVL 441 – Transportation Engineering, and CIVL 586 – Advanced Transportation Design.



These devices will also be used extensively in research projects by the California Pavement Preservation Center at CSU, Chico. The Sacramento Chapter APWA EEF has also sponsored upgrades to the Environmental Lab in 2019, upgrades to the Fluid Mechanics Lab in 2007, and development of the Internship Program in 2004. Thank you, APWA Sacramento Chapter!



Auto-SCB



LA Rattler



Coarse Aggregate Angularity



Fine Aggregate Angularity



Improving Data Quality In A PMP

By Sui Tan, Metropolitan Transportation Commission (MTC)



Congratulations for implementing a pavement management program in your agency. With the pavement management software, such as MTC's StreetSaver, you can maintain your road network in the most cost-effective way. You are now capable of developing a multi-year road maintenance plan, running different budget scenarios to see the impact of funding to your network condition, and setting various performance targets to achieve your pavement management goals.

For the effective use of your pavement management software, however, it needs up-to-date pavement condition data to support the analysis. Sure, you said, we have a data collection program of surveying the network every two years for arterials and collectors, and every four years for residential streets. This 'best management practice' is to be applauded. For every round of data collection, however, do you know if your data collection vendor or in-house

staff is collecting quality data? Do you have a data quality management plan?

Data Quality Management Plan

What is a data quality management plan (DQMP)? According to FHWA's Practical Guide for Quality Management of Pavement Condition Data Collection, a DQMP is "a document that defines the acceptable level of data quality and describes how the data collection process will ensure this level of quality in its deliverables and processes." The quality management activities ensure that:

- Data will meet agreed-upon standards and requirements,
- Work processes are performed as documented, and
- Non-conforming data are identified and appropriate corrective action is taken.

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Fortunately, if you are a StreetSaver user, MTC has already developed a DQMP (<https://streetsaver.com/academy/mtc-data-quality-management-plan>). We have used this plan to hire our 'bench consultants', seven highly qualified data collection vendors, through our request for qualification. All interested proposers must be pre-qualified through the Vendor Certification Program (see below). This plan is also available for any local agencies to use, modify, or cite in their request for proposal (RFP) to vendors. This will ensure that you are inviting only the most qualified vendors that have been certified by MTC.

Vendor Certification Program

The Vendor Certification Program (VCP) consists of vendors passing a pavement distress survey exam, and at least one person in the data collection team must be certified under the Rater Certification Program (RCP) (see below). This exam is designed to evaluate the skills and knowledge of data collection vendors on pavement condition rating based on the MTC's modified ASTM-D6433 distress protocol (<https://streetsaver.com/products/Ebooks>). The rating protocol has eight distresses for flexible pavement and seven distresses for rigid pavement. A vendor can be certified for manual or automated survey, or both. Vendors must rate up to 24 test sites and achieve the required level of accuracy in performing ratings, as defined by the acceptance criteria for vendors. Vendors who are interested in working with MTC can be pre-qualified through the VCP, or any vendors who are interested in working with StreetSaver users can be certified as well. The vendor certification exam is conducted twice a year. Upon successful completion of the exam, a certificate will be issued that is valid for two years. Renewal is good for another two more years upon providing raters with current certification.

Every four years, all certified vendors must take the field exam to be re-certified.

Rater Certification Program

Equally important in the data collection activities is to make sure that all personnel involved are proficient in the MTC rating protocol mentioned above. The RCP consists of passing a pavement distress manual survey exam, and an online written exam. These exams are designed to evaluate the skills and knowledge of raters on pavement condition rating based on the MTC's rating protocol. A rater must rate up to 24 test sites and achieve the required level of accuracy performing ratings as defined by the acceptance criteria for raters. Raters from vendors and from local agencies can be certified. The rater certification exam is conducted twice a year. Upon successful completion of the exams, a certificate will be issued that is valid for two years. Renewal is good for another two more years upon successful completion of an online refresher course. Every four years, all certified raters must take the field and written exams.

Remember the old adage, 'Garbage in, garbage out'? If you are investing thousands of dollars in data collection, then you need a plan to ensure quality data is being collected. If your agency is planning to hire a consultant, or if you're collecting pavement data 'in-house', here are the action items you need to take:

- Develop a data quality management plan
- Hire an MTC-certified vendor with certified raters
- Get your staff certified by MTC (if collection is done in-house)

For more information contact Sui Tan at: stan@bayareametro.gov



FHWA Update

Mobile Application "Checklist" for Pavement Preservation Treatments

A mobile Application, called "Checklist", was developed by Iowa State University and the National Center for Pavement Preservation, and is based on the FHWA's 2019 updated checklists. The FHWA 2019 updated pavement preservation checklists are also available in pdf format from this FHWA website: <https://www.fhwa.dot.gov/pavement/preservation/ppcl00.cfm>

By Chu Wei, FHWA – Sacramento

The "Checklist" Application helps guide State and local highway maintenance and inspection staff in the proper use of pavement preservation processes. Users can find checklists on topics ranging from using thin hot-mix asphalt overlays, to performing full-depth repair of concrete pavements, and to applying crack seals to pavements. The new Application provides highway agencies and contractors with all the checklists they need in an easy-to-use mobile format, ensuring that highway workers have useful information on [Continued, next page](#)



the job site. The free "Checklist" Application is available for android and iOS devices. To obtain the free App, for android devices, search for "pavement preservation checklist", and for iOS devices, search for "Iowa State University pavement preservation."



Every Day Counts (EDC-6) Launched

FHWA has launched the seven innovations selected for the sixth "Every Day Counts" (EDC-6) program, including Targeted Overlay Pavement Solutions for the pavement discipline this year. For more information, please visit:

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_6/targeted_overlay_pavement.cfm

On December 8-10, 2020, FHWA hosted a virtual 'EDC Summit' to discuss these innovations, which will explore ways to better engage people, use products to enhance and preserve our infrastructure, and improve processes to gain efficiencies in the delivery of projects and operation of our highway systems. To register for the EDC Summit, please visit : https://www.fhwa.dot.gov/innovation/everydaycounts/edc_6/summit.cfm

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



COMING EVENTS - Mark Your Calendar!

By Roger Smith, CP2C



"Asphalt Pavement 101" Classes January 27-28, February 10-11, February 24-25 (Online)

This popular class from CalAPA offers an overview of the basics of asphalt pavement including asphalt materials and HMA pavement construction. It will continue to be offered virtually as two, 2-hour sessions, until further notice. This class is also available by request to road agencies or companies.

For more information go to: www.calapa.net

Slurry Systems Workshop January 18-21 (Virtual)

The ISSA Slurry Systems Workshop is a study course offering a challenging and informative program on slurry seal, micro surfacing, chip seals and crack treatments. Highly qualified Pavement Preservation Specialists will cover topics on the above listed processes, including materials and equipment, specifications, hand mixes, calibration, quality control, and inspection. This year Workshop is going virtual, but is committed to providing you with the same level of education and training that attendees have come to expect each year. <https://www.slurry.org/>

FHWA / PPRA Webinars Various Dates (Online)

FHWA will continue to team up with the Pavement Preservation and Recycling Association (PPRA) to offer short webinars on various popular pavement maintenance treatments, including crack sealing, slurry surfacing, chip seals, Cape seals, and proper handling of asphalt emulsion products. Find more information and dates contact: Jason.Deitz@dot.gov



Pavement Sustainability Class February 8-10 (Online)

The course will introduce definitions and metrics for assessing and improving the sustainability of pavements across the life cycle using the concept of life-cycle thinking. Strategies and approaches for different stages of the life cycle, different contexts, and differing goals of agencies will be discussed. Cost and social considerations will also be discussed. This is an introductory-level course offered by the City and County Pavement Improvement Center (CCPIC) in partnership with U.C. Berkeley TechTransfer.

<https://registration.techtransfer.berkeley.edu/CourseStatus.awp?&course=213CCA020208>



PPRA Annual Meeting February 15 -18 (Virtual)

The Pavement Preservation And Recycling Alliance (PPRA) is made up of the International Slurry Surfacing Assn. (ISSA), the Asphalt Emulsion Manufacturers Assn. (AEMA) and the Asphalt Reclaiming and Recycling Assn. (ARRA). Although they will hold their annual meeting virtually this year, attendees will have an opportunity to hear about industry-wide topics in general sessions, and also focus on specific topics in separate sessions for the

Continued, next page



three groups. <https://www.aema.org/mpage/21PPRAAnnualMeeting#Registration>

Introduction To Pavement Engineering & Management Class March 8-11 (Online)

The course introduces the functional requirements of pavement for different purposes, including streets, roads, highways, and bicycle/pedestrian paths, and the types of pavement that can meet those functional requirements. The class provides a basic understanding of how pavement materials, structural design, construction, and asset management interact to affect pavement performance for each pavement type. The class covers all of the pavement distresses occurring in California within the context of the various climate regions and traffic conditions in the state. This is the primary introductory course in the pavement engineering and management training program offered by the City and County Pavement Improvement Center the CCPIC in partnership with U.C. Berkeley TechTransfer.

<https://registration.techtransfer.berkeley.edu/CourseStatus.awp?&course=213CCA010308>

Asphalt Pavement Preservation treatments: Materials, Construction and Quality Assurance Class June 21-24 (Online)

Asphalt pavement is a major component of our transportation system. Transportation agencies at the city and county level can maximize the value of their huge investment in streets and roads by using proper pavement preservation

strategies. This course provides a solid working knowledge of the most common asphalt pavement maintenance and preservation practices. Common preservation treatments, basic principles, best field practices and quality assurance issues are covered. This is a core course in the pavement engineering and management training program offered by the City and County Pavement Improvement Center (CCPIC) in partnership with U.C. Berkeley TechTransfer.

<https://registration.techtransfer.berkeley.edu/CourseStatus.awp?&course=214CCC020621>

The Asphalt Institute and NAPA Webinars

Asphalt Institute's national training offerings can be found at: <http://www.asphaltinstitute.org/training/seminars/>



The National Asphalt Pavement Association

(NAPA) offers webinars on various topics. For current listings go to: <https://www.asphalt-pavement.org/programs/napa-webinars>

Transportation Research Board (TRB) January 2021

The TRB 100th Annual Meeting will be conducted as a virtual event over a series of dates throughout January 2021. The meeting program will cover all transportation modes, and will feature sessions on how COVID-19 has impacted transportation and how transportation professionals and researchers are responding. You can browse the full 2021 program, and get full details on sessions, workshops, and committee meetings, via the Online Program or go to: www.trb.org



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Caltrans established the California Pavement Preservation (CP² Center) at CSU, Chico in July 2006, and fully funded the Center in January 2007. Dr. DingXin Cheng is the current Director of the Center. Mr. Deepak Maskey 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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COMING
EVENTS