CP² Center News

Newsletter of the California Pavement Preservation Center

No. 58 June 2021

Developing Slurry Seal Performance Models for Pavement Management System - StreetSaver®

By DingXin Cheng (CP2C), Roger E. Smith (Retired from Texas A&M), Sui Tan (MTC), and Mario Jaquiz (CP2C)

A slurry seal is a popular pavement preservation treatment, which consists of mixtures of polymer modified or conventional emulsified asphalt, graded aggregates, water, and other additives, such as mineral filler as shown in Figure 1. Based on the Manual for Slurry Surfacing published by the Mineta Transportation Institute (MTI), a slurry seal is "… a cost-effective maintenance treatment used for public roads, highways, airport runways, parking lots, and a variety of other projects." As a cold mix surface treatment as shown in Figure 2,a slurry seal creates a weathertight surface, provides color and texture in a single pass, fills small cracks and surface voids, and stops raveling from old surfaces. Slurry seals are typically included in agencies' maintenance and rehabilitation (M&R) tool boxes and decision trees of pavement management systems. However, the performance prediction models for slurry seals are mostly empirical, or based on expert opinions. Funded by California SB1 fuel taxes, the California State University Transportation Consortium (CSUTC) was tasked to develop a performance model for slurry seals using the local agencies' database from StreetSaver®, a pavement management system developed by the Metropolitan Transportation Commission (MTC) of the San Francisco Bay Area.

Figure 1. Slurry Seal Construction

Figure 2. Fresh Slurry Seal on Old Pavement

A total of 537,891 records were collected from 18 different agencies in the United States. Out of these records, 1,195 slurry seal projects met the requirements to be utilized in the development of slurry seal performance models, as show in Table 1. As expected, the residential streets had the biggest dataset for slurry seals, while the arterial streets had the smallest.

In this study, we started the modeling of the slurry seals from individual slurry seal projects. As shown for a typical project in Figure 3, a slurry seal project was constructed on a 10-year old asphalt concrete (AC) pavement. The blue curve represents the predicted project performance curve without the slurry seal maintenance. The orange squares represent PCI survey results after the slurry seal construction. A non-linear performance model

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(orange curve) was developed for slurry seal based on the PCI survey points after the slurry seal construction.

Table 1. Datasets for the Slurry Seal Performance Model Development

DESCRIPTION	SURFACE TYPE	NUMBER OF PROJECTS
RESIDENTIAL & LOCAL	AC & AC/AC	914
COLLECTOR	AC & AC/AC	162
ARTERIAL	AC & AC/AC	119
	TOTAL:	1,195

Based on the developed project level slurry seal model derived from all projects in each group, two important parameters were developed: PCI – the initial PCI increase/jump right after the slurry seal construction, and Chi – the change of the deterioration rate or slope of the slurry seal performance curve, expressed in percent. By using these two parameters, we can define the expected slurry seal performance curve, relative to the asphalt concrete project performance curve for any project.

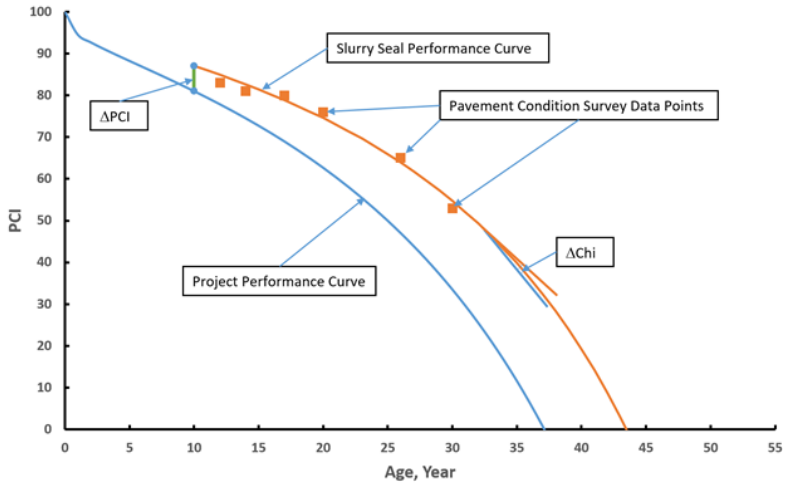

Figure 3. Modeling of An Individual Slurry Seal Project

The goal of the study is to develop data-driven performance models for slurry seals for use at the network level for the PMS, StreetSaver®. The performance model results of the 1,195 slurry seal projects were categorized into three different functional classes: residential or local roads, collectors, and arterials. After non-linear regression analysis, the network level ΔPCI and ΔChi curves were developed.

Findings

The performance curves for slurry seals placed on an AC pavement vary depending on the existing pavement's performance curve and the timing of slurry seal application. As illustrated in Figure 4, slurry seal performance is highly dependent on the PCI value of the existing pavement right before the slurry seal application. In Figure 4, the red curve represents a slurry seal model constructed at PCI of 90; the green curve represents a slurry seal model constructed at PCI of 80; the blue curve represents a slurry seal model constructed at PCI of 70; the purple curve represents a slurry seal model constructed at PCI of 45. The black line at PCI of 25 represents the cutoff line, below which the pavement is considered failed. The purple curve's initial PCI jump, ΔPCI, is higher than that of green line. However, the benefit of a slurry seal applications, in terms of improvement of PCI over time, is not only dependent on the ΔPCI, but also the change of deterioration rate, and the timing of application. More importantly, the benefit or effectiveness of a slurry seal can be represented by the Beneficial Area (BA), which is the area bound by the project performance curve, ΔPCI, slurry seal performance curve, and cutoff line.

An example of BA for the slurry seal constructed at PCI 45 is shown in the shaded area in Figure 4. Although the ΔPCI for a slurry seal constructed at PCI of 45 is higher than that for a slurry seal constructed at PCI of 80, the BA of a slurry seal constructed at PCI of 80 is much larger than that of a slurry seal constructed at PCI of 45.

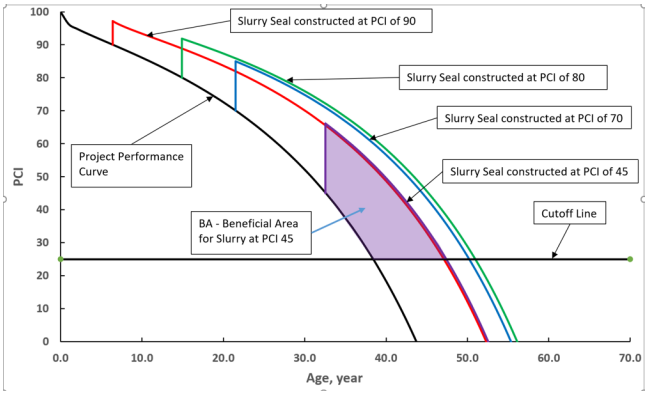

Figure 4. Beneficial Area Concept

The BA for a slurry seal constructed at any existing PCI value before maintenance can be calculated using ΔPCI and ΔChi and preexisting pavement performance curve. The BAs on residential, collectors, and arterials are plotted against PCI values existing before maintenance in Figure 5. The BAs of slurry seals constructed on residential, collectors, and arterials are represented on green curve, red curve, or blue curve, respectively. By looking at the trend of each curve, the BA is higher for a slurry seal constructed at relatively good pavement conditions than that of a slurry seal constructed at excellent or poor pavement conditions. This trend is consistent with the

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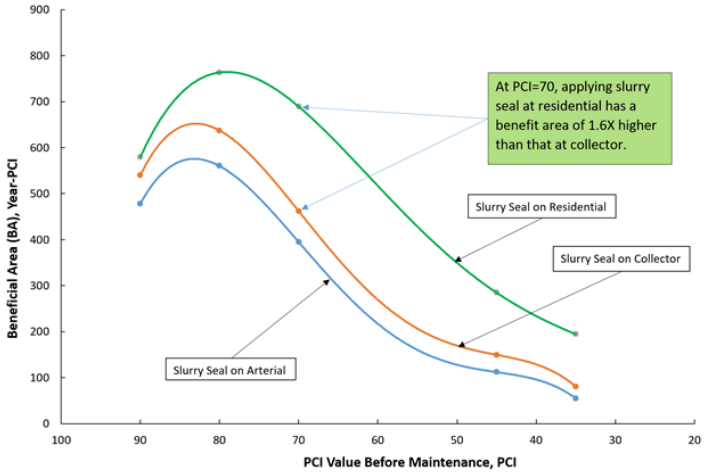

Figure 5. Beneficial Area on Residential, Collectors, and Arterials

common knowledge that the slurry seal should not be applied too early or too late.

Slurry seals generally have higher BAs on residential streets than those on collectors or arterials. It is evident that applying slurry seals at 70 PCI on residential streets has a benefit factor of 1.6 times higher than on collectors based on the dataset in this study. This could be due, in part, to the lower traffic loading and traffic volumes on residential streets.

In summary, the slurry seal performance models were developed based on the real pavement condition survey data from the MTC's PMS, StreetSaver®. These slurry seal models can improve the accuracy of predicting slurry seal performance using StreetSaver®. Furthermore, the slurry seal performance models can be used to develop BA curves, which are useful to estimate the cost-effectiveness of slurry seals constructed at various PCI values and identify the optimal timings for slurry seal applications.

For more information, please contact Ding Cheng at *dxcheng@csuchico.edu* or Sui Tan at *stan@bayareametro.gov*.

Platics in Asphalt

By Roger Smith, CP² Center

Since China's ban on the import of used plastics, about 45% of the world's waste plastic must find a new home. This has resulted in interest in including waste plastic in asphalt products, including pavements, and companies are now offering proprietary blends for asphalt mixes with claims of improved pavement performance. California legislation is also requiring research into this technology.

In the face of this growing interest, a joint Asphalt Institute/NAPA task force was formed in late 2019 to address the topic of recycled plastics in asphalt. The objective of the task force was to develop a document that would synthesize the literature, and from that describe current state of the knowledge while identifying knowledge gaps and future research needs.

This objective was completed in Nov 2020 with the release of free downloadable publications, now available on the NAPA and Asphalt Institute websites.

Go to :*http://www.asphaltinstitute.org/engineering/plastics-in-asphalt/*

AASHTO ETF Update

By Colin Franco (RI DOT), Larry Galehouse (NCPP) and R. Gary Hicks (CP² Center)

ASPHALT PAVEMENT NEWS

The American Association of State Highway and Transportation Officials (AASHTO) TSP·2 Emulsion Task Force (ETF) continues to work on developing material specifications, design practices, quality assurance specifications, and construction guides for all emulsion-based pavement preservation treatments. Many of the materials specifications and design practices have already been approved and published by AASHTO. The construction guides for chip seals, micro surfacing, and fog seals, developed under NCHRP Project 14-37, were submitted to the AASHTO Committee on Material and Pavements Technical Subcommittee 5b (COMP TS 5b) for balloting in November 2020 and were approved, and they should be published later this year. Other guides are currently being developed through NCHRP Project 14-43 "Construction Guide Specifications for Cold Central Plant Recycling and Cold In-Place Recycling" by NCAT, and NCHRP Project 14-44 "Guide Specifications for the Construction of Slurry Seals, Scrub Seals, and Tack Coats" by the University of Arkansas. All presentations given at the TSP-2 meeting on May 24, 2021 can be found at : *http://tsp2-etf.org/*.

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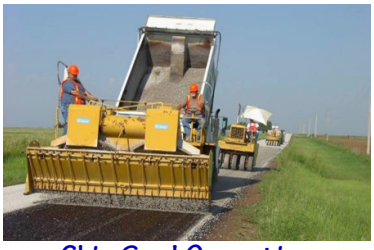

Chip Seal Operation

Research

A 'research needs' statement proposed by the ETF resulted in the approval of NCHRP Project 9-63. The project, "A Calibrated and Validated National Performance-Related Specification for Emulsified Asphalt Binder", continues its work to develop and validate a performance graded (PG) specification for asphalt emulsions. This work involves recommending a recovery method for obtaining an emulsion's residual asphalt, and a suite of tests which relate to the performance of emulsion treatments like chip seals, slurry surfacing systems and others. The project is being performed by the Asphalt Institute (AI) and NCAT under the leadership of Mike Anderson of the AI. Mike reported that the Phase 1 report was submitted, and issues being addressed in Phase 2 include developing the recovery method for the asphalt residue, identifying the low/ intermediate and high temperature properties of the residue which relate to performance, and the effects of polymer modification of the binder. The project is expected to be completed in 2022.

The ETF also developed an important research problem statement on the topic of "Developing Performance and Safety Specifications for Rejuvenating Seals". The project, submitted by Rhode Island DOT was approved for FY 2022 as NCHRP project 10-114, and proposals will be requested later this year. The proposed research is intended to answer how to measure and quantify the performance and safety of rejuvenating seals in the laboratory and field.

Another NCHRP project (14-48) was also submitted by RI DOT and approved to develop construction guides for sand seals and Ultra-Thin Bonded Wearing Courses (UTBWC). The RFP for this project will also be released later this year. This will complete the development of a slate of AASHTO standards (i.e. Materials specs, Materials design practices, Construction guides and QA specs) for all emulsion-based pavement preservation treatments.

Accepted 'Best Practices'

'Best practices' documents for emulsified asphalt chip seals and slurry systems were started in 2020. The chip seal 'best practices' document is now complete and can be found on the ETF website at *http://tsp2-etf.org/* , while the 'best practices' for slurry systems is in final review, with expected completion in June, 2021. The publication date for slurry systems has not yet been determined.

Implementation Project

The 'best practice' documents will be used in NCHRP Project 20-44(26) "Implementing Guide Specifications for the Construction of Chip Seals, Micro Surfacing, and Fog Seals" to facilitate the use of the new AASHTO standard specifications and guides. This project started in October 2020, with an initial priority of developing an appropriate message about the importance of adopting these specifications and guides. The project will also include an outreach to state and local agencies, free training, and construction of demonstration projects. So far, a total 50 projects have been identified with 30 agencies hosting them. The contract is being executed under the leadership of Larry Galehouse of the National Center for Pavement Preservation (NCPP) with support by the AASHTO ETF under the leadership of Larry Tomkins of Ergon. If any state or local agency is interested in participating in the construction of a demonstration project, please contact Larry Galehouse at *galehou3@egr.msu.edu*. Free training and assistance with the assembly of project contract documents will be available upon request. All specification final drafts can be found at the ETF website located at: *http://tsp2-etf.org/*.

Certification and Training

The ETF also is endorsing a "National AASHTO Certification Initiative", where individual practitioners and companies can get certified in all aspects of design and construction of emulsion-based pavement preservation treatments. It is extremely important to have a consistent education and training syllabus for each treatment that can be taught by capable individuals and institutions. More information about the National Certification process can be found at *https://www.tsp2.org/certification-information/*

Summary

In summary, the Emulsion Task Force has made considerable progress in developing national specifications for pavement preservation treatments during the past 5 years. It is expected that with improved specifications, as well as certification and training, fewer early failures with preservation treatments will occur. For more information on any of the AASHTO ETF current or planned activities please contact Colin Franco at *colin.franco@dot.ri.gov*

CalAPA Technical Meeting Topics

By Roger Smith, CP^2 Center

CalAPA recently hosted two online webinars related to asphalt pavements in California. The monthly technical webinar for CalAPA's regional technical committees focused on the use of terminally blended asphalt rubber binders. CalAPA also brought back their revised training course on the Caltrans Section 39 Specification.

Caltrans Standard Specs – Section 39 Overview

Brandon Milar of CalAPA presented an overview of Section 39 of the Caltrans Standard Specifications, which deals with asphalt pavement. The session was attended by over 70 industry stakeholders attesting to the fact that many need help in navigating the Caltrans specs. Attendees included professionals from Caltrans, local agencies, engineering firms and various segments of private industry. This training course provided an overview of the specification structure, key portions of the specification, and recent changes. Also, attendees were provided resource links to the specification, reference documents, guidance documents, and a handy glossary of terms. The Caltrans Standard Specs will likely be available only in the electronic online form (not printed) in the future, but will be updated on an annual basis, instead of just once every 5 years. Section 39 deals with four common asphalt pavement types: Type A Hot Mix Asphalt (HMA)-Type A, Rubberized Hot Mix Asphalt – Cap Graded (RHMA-G), Open Graded Friction Courses (OGFC) and Bonded Wearing Courses (BWC), as well as Minor Hot Mix Asphalt. Each segment covers materials, construction and payment. Other Sections of the Standard Specs that relate to asphalt pavement are Section 92 – Asphalt Binders, Section 94 – Asphalt Emulsions, Section 37 – Bituminous Seals and Section 36 – General / pavement smoothness.

Recycling Tire Rubber -Terminal Blended Update

California leads the nation in the use of recycled tires in pavement materials. Most California agencies utilize asphalt rubber mixes (RHMA and ARHM) where the asphalt rubber binder is blended at the mix plant. Another option for agencies is to use an asphalt mix with a rubber modified binder blended at the asphalt binder facility (e.g., refinery or terminal). This session provided an overview of the current state of 'terminal-blended' asphalt rubber binders, like PG-TR and MAC-15, and the latest technical information and use in California, Arizona and Texas. The presentations included an overview of how the ground tire rubber is incorporated in the asphalt binder at a binder terminal, a summary of research related to the performance of these binders, and background on the technology that enables the blending at the terminal. After the presentations, an expert panel was available to field questions on the use of terminally blended asphalt rubber binders and to share their experiences with he use of these binders in asphalt mixes (including mix production and laydown) and in pavement preservation seal treatments. The panel included the presenters as well as mix producers and contractors.

Presenters: Dr. Peter Sebaaly - University of Nevada Reno, Hashem Hashemi and Simon Yuanchen - U.S. Polyco, and Bob McGennis, P.E. - Holly Frontier Refining

Panelists: John Knieff - SRM and SRM Construction, Shawn Smith - Kelterite Materials, Shawnan Construction, Lance Allen - RA Slurry Seal, and Bob Rivers - Asphalt Supply and Technology

For more information on these webinars, for access to the terminally blended asphalt rubber webinar recording or to sign-up for future webinar notifications contact Brandon Milar at: *bmilar@calapa.net* or go to: *www.calapa.net*

FHWA/PPRA Pavement Preservation Webinar: CIR and CCPR

By Jason Dietz, FHWA

Through good times or bad times, it is important to continue applying pavement preservation treatments on the right road, right treatments, at the right time.

The Federal Highway Administration (FHWA), in partnership with the Pavement Preservation and Recycling Alliance (PPRA), has been offering free monthly Pavement Preservation webinars since February 2020 for anyone interested 'in keeping good roads good'. These webinars are designed to help agencies preserve their investment in roadways, enhancing safety, extend pavement

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life, improve functional performance, and contribute to increased user satisfaction.

The September 2020 topic was on Cold In-place Recycling (CIR) and Cold Central Pavement Recycling (CCPR). The webinar was given by Jason Wielinski of the Heritage Group. Topics that were covered during his presentation included: sustainability, understanding the Cold In-place (CIR) and Cold Central Plant Recycling (CCPR) processes, project selection and construction, mix design, and review of some example projects.

CIR and CCPR 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, knowing the pavement load restrictions, checking drainage and base and subgrade conditions, and a review construction records. CIR cannot bridge poor subgrades and needs a strong base for compaction.

CIR

We started off by discussing the economic and environmental benefits that CIR offers. It is a less disruptive alternative to conventional methods and in some cases, provides a base for the first time. CIR offers significant energy savings while it stops the depletion of natural resources. With CIR, it saves the agency time by having the roadway open during construction. Additional benefits include up to one lane mile per day production, reduced impact to adjacent roadways and driveways, reduced cost over reconstruction, re-use of existing material, reprofile of the roadway, and improved curb reveal.

The CIR operation occurs within the roadway to be recycled and used 100 percent of the RAP generated during the process. CIR treatment depths are generally 3 to 5 inches, with the use of a stabilizer of emulsified asphalt (engineered emulsion) or foamed asphalt, typically at 2-3 percent. Treatment as thin as 2 inches is possible with good underlying support, and up to 5 inches, provided proper compaction can be achieved.

CIR Equipment Train

CCPR

The CCPR process is similar except for 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 supplemental corrective aggregates, and water. Like CIR, CCPR 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.

CCPR Mixing

Completed CCPR (FHWA)

Pavement sampling and 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 monitored.

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

The compacted CIR and CCPR mixtures must adequately cure / dry before secondary compaction. In addition, a wearing surface is needed. The rate of curing is variable and depends on several factors, including recycling agent used, environmental conditions, drainage, and moisture characteristics of the mixture. Typical curing periods can be as short as a few hours, to up to several weeks. Continued, next page

(NCHRP 9-62 will discuss the rapid tests and specifications for recycled pavements.) When a faster cure is necessary, a recycling additive (lime or cement) can be used. 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. FHWA Check List and TechBief 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*

2. 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. NHI 131050 updated course *https://www.nhi.fhwa.dot.gov/course-search?sf=0&course_no=131050*

4. PPRA, *www.roadresource.org*

For more information please contact Jason Dietz at *jason.dietz@dot.gov* or Jason Wielinski at *Jason Wielinski@hrlab.com*

Recorded Webinars

July 16: Engineered Emulsions

Sept. 17: Cold In-place Recycling and Cold Central Plant

https://roadresource.org/webinars

For more information on these webinars and to register go to: *https://roadresource.org/webinars*

City of Santa Rosa Takes Awards

From: 'Save California Streets', 'American Concrete Institute' and 'Engineering News & Review'

The 2021 'Outstanding Local Streets and Roads Project Award' winners were announced, with the city of Santa Rosa taking top honors for their concrete paving project.

The Awards program was developed to recognize and raise awareness of the exceptional achievements made by California's cities and counties to preserve and protect the public's investment in the local streets and roads system, which is critical for the safety and mobility of the traveling public, emergency responders, law enforcement, the economy, and multimodal needs such as bicycles and buses. The program is sponsored by the League of California Cities, the California State Association of Counties, and the County Engineers Association of California. The Santa Rosa Project is described below.

The City of Santa Rosa's "Fulton Road Reconstruction" project between Occidental Road and W. 3rd Street repaired approximately 3,200 lineal feet of 4-lane principal arterial pavement and associated bike lanes. This North-South arterial is separated by a landscaped median and sees a remarkable 25,000 vehicles per direction per day. Innovation and adaptability were key to the success of this project in both short and long-term aspects.

The City strives to be a pioneer in the region testing and implementing new solutions, construction systems, materials, and bidding

practices. Fulton Road exemplified this using Alternative Design/Alternative Bid (AD/AB) bidding, which allowed both traditional asphalt and Roller Compacted Concrete (RCC) pavement sections to compete in a live and competitive bid. Implementing AD/AB saved the City over $1 million as the RCC cost far less than the normal asphalt pavement.

Furthermore, the concrete pavement featured a minimum 40-year design life with expectations that it performs similar to Alston Way or other north-bay concrete pavements that are obtaining 50 to 100 years of service life with little to no maintenance. The reduced maintenance with concrete ensures that road closures due to maintenance will be lessened, increasing safety for drivers and road crews that no longer need to be on the roadways as often.

Positive environmental effects were also achieved as the concrete section recycled the existing

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base in-place eliminating the need to off-haul/ landfill over 5,000 CY of material eliminating roughly 500 dump trucks and another 5,000 CY or 500 trucks of virgin material. Based on a collaborative analysis of the construction time window, innovation of Ghilotti Bros. Inc. (GBI), and California Nevada Cement Association input – the RCC was swapped out for traditional PCC pavement. The City and GBI adapted the project to accommodate this change, and also took this opportunity to use a draft version of the PCC Pavement Specifications that are soon to be available on the City and County Pavement Improvement Center (CCPIC) website. Vetting of these specs will facilitate other agency's use of this pavement solution!

Safety, accessibility, and resiliency aren't buzz words in Santa Rosa. The devastating Tubbs Fire in 2017 heavily impacted the region challenging the infrastructure to (and sometimes past) its limits. Fulton Road was designed to meet the burden of heavy truck traffic while providing safe long-term access. Tragedy struck again with the Kincade Fire breaking out on October 23rd, 2019. Fulton Road was active under construction, but the City and Ghilotti Bros. acted quickly to make the road a drivable evacuation route for those fleeing the fire's path. We hope the many lessons learned during this project can act as an example for the League and CSAC in the quest for innovative and sustainable infrastructure!

See more at: *https://www.savecaliforniastreets.org/fulton-road-reconstruction-occidental-rd-to-w-3rd-st/*

Concrete Roadways In Roseville

(Reprint of a City of Roseville 'Design Standards Update' Bulletin)

The City fof Roseville's 2021 updates to Design and Construction Standards now include the option for concrete roadways. Concrete is an ideal choice for new developments because it provides aesthetic, safety, energy and cost-saving benefits.

Concrete roadways offer:

- Twice the longevity of asphalt;
- Reduced long-term maintenance, saving taxpayer money;
- Less frequent disruption to residents and roadways;
- Better nighttime visibility;
- Cooler roads during the day; and
- Less reliance on oil and petroleum.

These advantages come at costs that are competitive with asphalt roadways.

Current locations

The City of Roseville has successfully used concrete on recent pilot projects such as Washington Boulevard, Atkinson Street, Denio Loop, and Hickory Street. Upcoming improvements include the extension of Roseville Parkway from Washington to Foothills Boulevard.

CRCP on I-8 Earns Concrete Paving Award

(Info from SWCPA)

PCC PAVEMENT NEWS

The Southwest Concrete Pavement Association (SWCPA) congratulates three outstanding members whose innovation, ingenuity, and outstanding performance have earned them national recognition for their work in enhancing transportation in the West.

The three SWCPA members were announced winners at the 31st Annual National Excellence in Concrete Pavement Awards during the American Concrete Pavement Association's 57th Annual Meeting.

CRCP Overlay On I-8

Flatiron West was awarded Gold for their work with Caltrans on the Rehabilitation Project of I-210 in Los Angeles County. Granite's work with the County of Sacramento Department of Airports on the Pavement Rehabilitation of Runway 16R-34L at Sacramento International Airport earned them a Gold Award. And the Security Paving project of the I-8 Continuously Reinforced Concrete Pavement (CRCP) Overlays in Imperial County for Caltrans was awarded a Gold Award of Excellence.

For more information on these projects go to: *swcpa.org/caltrans-overlays-i-8-across-the-imperial-valley-with-long-life-pavement/*

IGGA 'Buried Treasure' Options


IGGA
International Grooving & Grinding Association
Your Pavement Preservation Resource® since 1972

buried treasure

Uncover Value with CPP

Buried Treasure Results in Road Improvement Savings

With a staggering number of roadways requiring repair across the United States, the need for cost-effective pavement improvement techniques remains one of the most pressing issues for roadway engineers and owners alike. In the past, many transportation agencies covered structurally sound concrete pavement with an asphalt overlay to improve the ride and friction or reduce tire pavement noise. With the steady increase in asphalt prices over the years, the mill and overlay option is becoming far too expensive. Diamond ground pavement surfaces often meet and exceed the smoothness, friction and noise characteristics of the best asphalt surface treatments and can be half the cost of an asphalt overlay. Provided that the underlying concrete pavement is still structurally sound, diamond grinding a previously overlaid pavement becomes a cost-effective solution and allows for the recycling of the asphalt millings as a gravel base or to be sold as reclaimed asphalt pavement (RAP) by the ton for a future asphalt project.

» A GREEN SOLUTION:
SUSTAINABLE AND COST-EFFECTIVE

The Buried Treasure concept using concrete pavement preservation (CPP) is a sound integration of engineering, economics and the environment. Technology and modern non-destructive testing tools have significantly advanced the amount of information that can be gathered about the underlying concrete pavement. Ground penetrating radar (GPR), the dynamic cone penetrometer and the falling weight deflectometer (FWD) are just a few of the modern testing tools now available. A thorough investigation of the existing pavement system is vital before undertaking this type of project. CPP is a long-term repair solution engineered to last many years that maintains the road's structural ability to carry heavy traffic loads. Stiff competition within the industry and

BENEFITS INCLUDE

LONG LASTING: Caltrans research has shown that the average life of a diamond ground surface in their state is 17 years.

BETTER FOR THE ENVIRONMENT: CPP is a sustainable pavement repair option offering a smaller carbon footprint as compared to an asphalt concrete overlay.

SIMPLE: No need for guide rail, sign or shoulder/slope modifications. CPP can be completed in off-peak hours with short and mobile lane closures.

SUPPORT LOCAL ECONOMY: All products are produced in the USA, with little foreign oil consumed in the process.

AVAILABILITY: Asphalt shortages and resulting price increases are likely to continue. The CPP industry has capacity and a consistent price structure.

EXPEDIENCY: CPP can be advertised, bid, let and completed in a short period of time.

FLEXIBILITY: Portland cement concrete pavement (PCCP) can be rehabbed using CPP up to three times with little loss of structural or load carrying capacity. Further, applying CPP in one lane doesn't require application in an adjacent lane.

COST-EFFECTIVE: CPP often costs less than thin asphalt concrete overlays.

SMOOTH RIDE: CPP with diamond grinding is smooth and it retains this smoothness longer than alternative surfaces on properly constructed concrete pavement.

QUIET: Diamond ground surfaces are typically much quieter than alternative surface textures applied to concrete pavement.

SAFE: CPP with diamond grinding is safe. WisDOT has shown that a diamond ground surface has 42% fewer accidents in dry and wet conditions as compared to a tined pavement surface.

FUEL EFFICIENCY: CPP with diamond grinding saves fuel. Studies have shown that rigid concrete surfaces exert less rolling resistance than flexible surfaces, thereby saving fuel.

PROVEN: CPP has been used by many DOTs for decades, dating back to its first use in California in 1965.

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November 2020

By Roger Smith, CP^2 Center

The "buried treasure" concept uses concrete pavement preservation (CPP) techniques to restore structurally sound concrete pavements that were previously overlaid with asphalt. With a diamond-ground finished surface, rehabilitated pavements often meet and exceed the smoothness, friction and noise characteristics of the best asphalt surface treatments and can be half the cost of an asphalt overlay.

To reap the benefits of buried treasure, the asphalt overlay is removed and applicable CPP techniques are used to restore the pavement to a condition close to or better than original, reducing the need for major and more costly repairs later. CPP addresses the causes of pavement distress, minimizing further deterioration. Available CPP techniques include slab stabilization, full and partial depth repair, dowel bar retrofit, diamond grinding and joint resealing.

For more information go to: *www.igga.net*

CCPIC Update

By John Harvey (UCPRC), Laura Melendy (UC Berkeley, Tech Transfer), and Gary Hicks (CP^{2}C)

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.

1. 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. A '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. Classes currently open for enrollment in 2021 include:

- CCA-01 Introduction to Pavement Engineering and Management, July 19-22, 2021
- CCC-02 Asphalt Pavement Preservation Treatments, Materials, Construction and Quality Assurance, October 25-28, 2021

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GENERAL NEWS

- CCB-01, Pavement Life Cycle Cost Analysis, November 30-December 2, 2021
- CCC-01 Asphalt Concrete Materials and Mix Design, December 6-9, 2021

New classes in the works for 2022 include:

- CCC-03 Pavement and Hardscape Construction Specifications and Quality Control Management (fall 2022)
- Paving Inspection (2022)
- Concrete Materials (2022)
- In-place Recycling (2022)
- Gravel Roads Engineering, Construction, and Management (2022)

As the core courses for the Pavement Engineering and Management Certificate are being completed and offered for the first time by early 2022 (to be formally announced soon), the CCPIC governance board of city and county pavement officials has requested planning for a new certificate program on Construction Inspection Certificate. This new program will include some of the pavement engineering and management classes as well as adding new classes to ensure agencies are able to properly inspect all types of pavement projects. Stay tuned on this effort.

We are adding classes to the schedule on a regular basis. So please check this site for the latest offerings: *www.techtransfer.berkeley.edu/schedule*

2. Technical Guidance and Tools

Efforts completed or underway on Technical Guidance and Tools include:

Best Practices for Pavement:

o Writing and enforcing specifications for asphalt compaction - completed

o Writing concrete mix specifications to improve durability and sustainability - completed

o 'Unpaving' to Create Affordable, Safe, Smooth Gravel Roads - completed

o Pavement Condition Index - completed

Tools and Model Specifications

o Pavement life cycle cost analysis spreadsheet software - completed

o Asphalt Compaction Model Specification Language - completed

o Concrete Pavement Model Specification Language – completed

o Superpave Mix Design for Local Government (SPLG) – completed draft is posted and looking for local agencies to pilot

o Tack coat specification - near completion

All completed guidance and tools are posted on the CCPIC website: *www.ucprc.ucdavis.edu/ccpic* .

Other efforts currently planned for 2021-22 include:

- 'RAP 101' Tech Brief
- Economic analysis of improvements in local agency pavement practices
- Environmental life cycle assessment tool for local governments

3. Resource Centers.

Recent activities for the 3 resources centers - Northern, Central, and Southern California - 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 by sending an email with the subject "Resource Center Presentation" to *ccpic@ucdavis.edu*. Presentations can be on the best practices, technical guides and tools or other related items.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 to 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.

4. Awards. The Concrete Pavement Specifications developed as a part of the CCPIC effort were used by the City of Santa Rosa to build a concrete pavement project, which has won some significant awards mentioned below:

a. "Overall Winner" award for the League of California Cities 2021 outstanding local streets and roads project awards

b. American Concrete Institute (ACI) as the regional award winner in the "Infrastructure" category

c. Engineering News Record (ENR) Regional Project of the Year Award for the "Transit/Airport" category

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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

By Cesar Lara, WRAPP President

The Western Region Association For Pavement Preservation (WRAPP) will continue its pavement preservation trainings for Caltrans in June, covering "Emulsions 101" with Sallie Houston of VSS. WRAPP will also be offering virtual trainings for members, starting with Chip Seals, featuring Jim Bailey of American Pavement Systems.

The WRAPP Board is going to start preparing for holding another of its popular Conferences in February. It will be a 'hybrid' type of event, where some will attend 'in person' and there will also be some sort of live online streaming of the presenters.

For more information go to: *www.wrapp.org*

FHWA Update

By Chu Wei, FHWA – Sacramento

A Virtual Asset Management Workshop Series

The California Department of Transportation (Caltrans) held a kickoff webinar on April 12, 2021 to formally begin the update of the 2022 CA Transportation Asset Management Plan (TAMP). Caltrans is currently hosting a series of workshops to engage the TAMP stakeholders, including local National Highway System (NHS) owners in the ongoing effort to update the TAMP. The kick-off webinar included an overview of the TAMP goals, timeline, and process, as well as an expert panel discussion featuring both national and regional FHWA experts who discussed the need to integrate the asset management, performance management, and the transportation planning and programming processes to help achieve the TPM targets and the TAMP goals and objectives.

Workshop #1, TAMP Fundamentals, was held on April 22, 2021, and focused on the Federal and State requirements of the TAMP, and mapping and understanding the NHS in preparation for upcoming workshops. Workshop #2, Financial Planning, was on May 24, 2021. The workshop materials are posted on Caltrans Asset Management Website: *https://dot.ca.gov/programs/asset-management/virtual-workshop-series-for-the-2022-tamp-update*

FP^2 Update

By Jim Moulthrop, FP^2

Communication is an important focus for the Foundation For Pavement Preservation (FP^2), a national non-profit group, supported by the pavement preservation industry's contractors, material suppliers and equipment manufacturers. We provide communication via our website, *www.fp2.org* , and the publication of a quarterly Pavement Preservation Journal. Although we have nearly 5,000 copies distributed internationally and a digital version posted on our website, many folks may not be aware of the Journal and all the useful information it presents, such as case studies and other articles that may be of value. The current issue (shown) has informative articles on pavement preservation. including surface regenerators, special 'cool pavement' treatments, pavement data collection, OGFC's and even a microsurfacing project at the Grand Canyon! If you're interested in obtaining a copy, go to our Journal website at *www.naylornetwork.com/fpp* or send me an e-mail at: *jimmoulthrop@gmail.com*

COMING EVENTS - Mark Your Calendar!

By Roger Smith, CP^{2}C

COMING EVENTS

U.C. Berkeley Technology Transfer Courses

These courses were developed in partnership with the City and County Pavement Improvement Center, funded by California Senate Bill 1, the Road Repair and Accountability Act of 2017.

- Asphalt Pavement Preservation Treatments, Materials, Construction and Quality Assurance (CCC-02)

  June 21-24, 2021 :: Online, 4 Sessions :: $190 Public Agency Fee, $380 Standard Fee

  Instructors: Erik Updyke and DingXin Cheng

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- Introduction to Pavement Engineering and Management (CCA-01)

  July 19-22, 2021 :: Online, 4 Sessions :: $190 Public Agency Fee, $380 Standard Fee

  Instructor: John Harvey

- Asphalt Pavement Preservation Treatments, Materials, Construction and Quality Assurance (CCC-02)

  October 25-28, 2021 :: Online, 4 Sessions :: $190 Public Agency Fee, $380 Standard Fee

  Instructors: Gary Hicks and DingXin Cheng

- Pavement Life Cycle Cost Analysis: The Basics (CCB-01)

  Nov 30 - Dec 2, 2021 :: Online, 2 Sessions :: $145 Public Agency Fee, $290 Standard Fee

  Instructors: Gary Hicks and DingXin Cheng

- Asphalt Concrete Materials & Mix Design (CCC-01)

  December 6-9, 2021 :: Online, 4 Sessions :: $190 Public Agency Fee, $380 Standard Fee

  Instructor: Brandon Milar

For more information go to: *https://registration.techtransfer.berkeley.edu*

CalAPA Training Classes

- Principles & Best Practices for Asphalt Plant Production: This class was broken up into two parts and was held on consecutive days from 9 a.m. to 11:30 a.m. on Tuesday, June 8 and Wednesday, June 9.
- Understanding the Job Mix Formula: This class was offered on Tuesday, June 15 from 9 a.m. to 11:30 a.m. Additional details and on-line registration is *HERE*.
- Troubleshooting HMA Production: This class will be held on Thursday, June 24 from 9 a.m. to 11:30 a.m.
- Asphalt Forensics: This class is particularly popular with public agency personnel. This class will be broken up in two parts and held on consecutive days on Tuesday, July 29 and Wednesday, July 30 from 9 a.m. to 11:30 a.m.

For more information go to: *www.calapa.net*

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/*

FHWA / PPRA Webinars Varius 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.Dietz@dot.gov*.

The Asphalt Institute and NAPA Webinars (Online)

The Asphalt Institute offers national training on pavement design, asphalt binders, nix design and asphalt construction. For more information 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*

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. 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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