



# CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

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## Caltrans Bets On GRCS

By Dennis Rogers, Tensar Corp.

Serving as the District Maintenance Engineer for Caltrans' District 9 (Bishop) for over 22 years, John Fox has overseen thousands of miles of pavement preservation treatments including polymer modified gap graded pavements, dense graded pavements, asphalt rubber seals, microsurfacing, and GRCS® to name a few.

One of the challenges of managing a large roadway network is prioritizing rehabilitation and maintenance projects with a finite budget. Key mainline and arterial roads demand high performance to ensure safety and efficiency. One critical project targeted for rehabilitation in Caltrans' District 9 was on US Highway 395 located in Inyo County, California. This high-emphasis route is a major freight corridor on the National Highway System, with 6500 average daily traffic with 15% heavy truck traffic. The highway is located 4,000 feet above sea level and is subject to a variety of weather and climate conditions, including snow.

In 2009 Caltrans completed the Blackrock 4-lane, a 14-mile long widening on US 395 from two lanes to four, with a new southbound alignment. According to John Fox, "A year after completion, I noticed the new pavement on the southbound lanes appeared dry and that there might be some asphalt mix segregation, so we placed a maintenance fog seal in 2011. This should have been a textbook example of successful pavement preservation. However, in 2012 I started to see alligator cracking in the wheel tracks. Since the cracking was isolated to a 1500-foot section at the north end of the project I figured we had some pumping base, but as it turns out we were going over an old lakebed.

We had some localized, weak subgrade, no problem, we can handle this." Unfortunately for Caltrans, the cracking continued to progress and expand to the entire length of the 14-mile-long widening project (see Figure 1).

"By 2014, I realized I had a serious problem, and this was not in my 10-year plan." said Fox. "I didn't expect to do anything on this road other than a preservation chip seal around year 10". But after reassessing the pavement, it was clear a new preservation plan was needed. Based on the aggressive cracking, I expected that a full-depth reconstruction would be needed in 15 or 20 years.

About that time, I received a sample of 'GlasPave50' paving mat from Tensar Corp, and I'd never seen anything like it - a biaxial, high tensile strength paving mat with a high melting point - and it's completely millable for future recycling operations. It struck me that this product would be perfect for a high-performance geosynthetic reinforced chip seal (GRCS) application on US 395".

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Figure 1. Existing US Highway 395 Roadway 7-8-18

GRCS can often extend the life of the existing asphalt pavement by providing an all-weather surface-wearing course and improved skid resistance, while increasing the load-bearing capacity by keeping aggregate base materials dry with the waterproofing abilities of the surface treatment.

One of the primary benefits of a GRCS is cost. According to Fox, "With an annual budget of \$5 million for capital funded preventive maintenance, we have limited options for large rehabilitation projects. If we construct a two-tenths (0.20') overlay, the cost would be over \$20-million, and I expect we'd see lower performance than with a GRCS. With the inclusion of GlasPave50, the GRCS cost was estimated at \$3 million. I now have a price and performance win/win."

In addition to budget constraints, there were several other key objectives for the US 395 GRCS system. As Fox put it, "I need a treatment that will seal a lot of cracks. The extent of existing cracking goes beyond what we can seal with a wand. I needed to arrest the progression of this cracking and squeeze more service life out of this pavement. I'm looking for a minimum of 10 years, hopefully 15 years. With a combination of the asphalt rubber chip seal and the GlasPave50 paving mat, with its biaxial tensile strength, I'm expecting to get some added structural value as well. Lastly, we also wanted to minimize lane closures for the safety of the workers and the traveling public".

Construction time and traffic disruption was also a big factor. To construct a typical medium overlay on twenty-eight miles, 45 working days would be budgeted. But for the GlasPave50 GRCS, the schedule was reduced by over 75% - to just 10 days.

Early steps in this project included developing a Construction Evaluation Work Plan and gaining approval from Caltrans headquarters. They also wanted to use this opportunity to collaborate with the California Pavement Preservation Center (CP2C) at Cal State Chico to study and monitor the performance of the GRCS.

Once the system was approved, a test plan and schedule was developed. At the south end of the project several test sections were constructed, which included a Control Section where no treatments were made to the pavement. The test sections included:

- a double-asphalt rubber chip,

- a double PME chip over paving fabric, and
- a double PME chip over the GlasPave50 paving mat.

The balance of the project was constructed using a quarter-inch PME chipseal over a 3/8" asphalt rubber chip seal, over the GlasPave50.

Evaluations in October 2020 showed cracks progressing in the control section (figure 2 and 3) while the entire section that includes the GlasPave50 remains crack free (Figure 4).



Figure 2 . Control Section cracking



Figure 3. Control section cracking



Figure 4. Crack-free GlasPave50 section.

"The thing about GRCS that was a revelation to me after seeing it actually demonstrated with a single PME chip over a pavement reinforcing fabric in 2009, is that GRCS© should keep cracks sealed for a long time to come and keep water out of the pavement and base. GRCSs should eliminate the need for maintenance to perform crack sealing for many years.", Fox remarked.

An unexpected benefit to Caltrans and drivers was the improved ride quality. "A year before this project, we constructed the same double chip with the quarter-inch PME chip seal over the 3/8 asphalt rubber chip seal - just south of Bishop to better understand this double chip process in preparation for this 3/8" GRCS. We had received complaints from the public about the ride quality and noise of our 3/8" chip seals. But the addition of the quarter inch PME chip substantially reduced the noise and provided a much smoother ride, and the addition of the GlasPave50 seemed to make the ride even smoother and quieter.", said Fox. The smoother ride also means less rolling resistance, which should translate into less fuel consumed. These benefits helped contribute towards Caltrans sustainability objectives,

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which also helped sell the double chip GRCS to upper management.

"We were very pleased with the outcome," added Fox. "This is a supercharged pavement preservation treatment. There's nothing else out there like this. This sealed cracks, and is expected to slow the rate of distress and provide the extension of service life I needed.

It minimized construction disruption and was budget friendly - with the bonus of a smooth, quiet ride."

For more information contact Dennis Rogers at: [DRogers@tensarcorp.com](mailto:DRogers@tensarcorp.com) or John Fox at: [john.fox@dot.ca.gov](mailto:john.fox@dot.ca.gov)



## Millable / Recyclable Paving Fabric

By Mark Marienfeld, Propex, and Ray Myers, Consultant

California agencies and private owners have been the greatest users of paving fabric interlayers in hot mix asphalt (HMA) paving since their inception 50 years ago. Usage of fabric interlayers waned over the last decade due to concerns over milling and recycling these interlayers, but use is on the rise again thanks to a new fully millable and recyclable paving fabric, Petromat Enviro. The benefits of including this sustainable paving fabric interlayer in new and rehabilitated pavements are:

- A full pavement moisture barrier, even when cracking eventually returns, see TRB Circular EC006
- Overlay performance against fatigue and reflective cracking comparable to an additional 1.2"-1.5" overlay thickness at a cost of about 0.5". (*TRB Synthesis Report*, Carmichael and Marienfeld)
- The ability to mill and recycle the fabric back into to new HMA with enhanced properties (NCAT Report, Gu)
- May be placed directly onto any milled surface, a challenge not viable with the very low elongation fiberglass-based 'mat' interlayers. (This eliminates the cost of a leveling course after milling.)

The City of Vista, California, had switched from paving fabrics to fiberglass-based interlayers to ensure future recyclability of the interlayer. However, according to Matt Attberry, P.E., Principal Engineer, CIP for the City, "Fiberglass paving mats tend to bunch up in the turns and don't adhere to the existing street with tack on hot days, like Petromat Enviro does." He went on to explain their interlayer selection, "Since traditional paving fabric has to be disposed of separately, we decided to use Petromat Enviro to avoid having additional

costs during future rehabilitation work."

Most of their streets have minimal pavement thickness, so their typical strategy is to place a leveling course to reestablish the proper grade and to avoid extensive patching and crack filling before the paving fabric was installed. Vista successfully used the Enviro product on several streets in 2020, and has 45 more streets slated for 2021 installation.

This 'sustainable' paving fabric interlayer system consists of a hot 'PG' asphalt cement tack coat, generally about 0.25 gal/sy, and the 5 oz/sy Enviro paving fabric, which meets all Caltrans and GreenBook specifications. It is installed quickly, ahead of the HMA overlay placement, which provides the heat and pressure to melt and reactivate the tack coat, drawing it up to fully saturate the fabric and to form an excellent bond to the overlay.

The moisture barrier function of the fabric interlayer is really the only way some existing pavement foundation layers can regain strength, short of total reconstruction or FDR. When the moisture content of the base, subbase and subgrade are lowered by stopping surface water infiltration, the bearing capacity of each of those layers can return to original design strengths or better. This eliminates pore water pressure damage under traffic, stops subgrade soil erosion and transport, stops freeze/thaw damage, stops stripping in older pavement layers, minimizes cracking over FDR or treated base/subgrade layers, and can control expansive clay soils.

The asphalt-saturated paving fabric is also a stress absorbing interlayer to attenuate stresses from underlying pavement cracking, helping to isolate the overlay from the rapid development of reflective cracking. Traditional overlay or mill-and-fill strategies can result in rapid reflective cracking and limited service life. This interlayer also 'layers'

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Petromat Enviro Fabric Placement



the pavement to greatly reduce the development of bottom up fatigue cracking in new or rehabilitated flexible pavements.

Propex, the original inventor of Petromat paving fabric and innovator of the new Petromat

Enviro has a very informative 1 PDH webinar available to all.

For more information contact Mark Marienfeld at [mark.mareinfeld@gmail.com](mailto:mark.mareinfeld@gmail.com) or Ray Myers at: [rmroads@gmail.com](mailto:rmroads@gmail.com)



## Caltrans Type III Asphalt Rubber Chip Seal Pilot Projects

By Lerose Lane and DingXin Cheng, CP<sup>2</sup> Center, and Steve Lee, Caltrans

### Introduction

In California, the asphalt rubber binder (AR) used in seal coats (chip seals) has typically been a field-blended binder (Type II), which consists of asphalt binder, asphalt modifier (extender oil) and crumb rubber modifier (scrap tire crumb rubber and high natural crumb rubber). Another field blend, AR binder (Type III), which uses a de-vulcanized rubber, is currently being tested in Arizona. AR (Type III) does not require high natural crumb rubber and asphalt modifier. As technologies advance, Caltrans would like to evaluate the performance of AR binder (Type II), compared to AR binder (Type III) and its potential for applications on Caltrans projects – especially in cold climate regions, where pavements are subject to snow plowing and tire chain wear.

### Construction

Caltrans has been using AR seal coats as a pavement preservation strategy or an interlayer for pavement rehabilitation projects since 1970s. Seal coats, commonly called chip seals, involve a hot asphalt rubber binder or an asphalt emulsion spray application, followed by a layer of clean, crushed stone. After rolling, the aggregate ends up embedded into the hot binder or emulsion. The chip seals not only seals the existing pavement surface to extend its service life, but also provides a wearing course with good skid resistance.

Caltrans constructed the first AR (Type III) chip seal pilot project in Caltrans District 2, Siskiyou and Modoc Counties, on State Route (SR) 139, near Newell from June 15 through 22, 2021. A second pilot project was constructed in District 2, Modoc County, on SR 299, in a high desert region near Canby, California, from June 23 through 25, 2021. Canby is located about 25 miles west of Alturas. These pilot projects were initiated by contract change order, with the approval of Caltrans Headquarters Senior Pavement Engineer, Steve Lee, and the District 2 Maintenance Division.

Like the first SR 139 pilot project, the additional test sites on SR 299 will help Caltrans evaluate the performance characteristics of AR binders – both Type II and Type III. The performance expectations are that they will yield similar results as far as texture, and appearance. But it is expected that the AR (Type III) will be more durable in the cold weather climate where snow removal can cause problems. The pilot projects also evaluated the aggregate retention, aggregate embedment, texture, raveling and resistance to reflective cracking. Table 1 summarizes the basic information about the two pilot projects.

Table 1. Summary of Two Rubberized Chip Seal Projects

	District 2, SR 139	District 2, SR 299
Prime Contractor	American Pavement Systems, Inc. (APS)	American Pavement Systems, Inc. (APS)
Base Binder Source & Grade	Albina PG 58-22	Albina PG 64-16
Asphalt Rubber Blending	APS using Eagle Peak Facility, near Alturas for (Type II) and (Type III)	APS using Eagle Peak Facility near Alturas for (Type II) and (Type III)
Binder Testing	Wood Environment and Infrastructure Solutions, Inc., Caltrans, and CP2 Center	Wood Environment and Infrastructure Solutions, Inc., Caltrans, and CP2 Center
Climate Region	High Desert	High Desert
Initial Pavement Condition	Good	Fair

**Test Section Layout**

Both projects included test sections, and within each test section, four 500-foot long Performance Evaluation Sections (PESs) were identified for close study. For the two projects, the existing pavement condition in each PES section, prior to the seal coat applications, was evaluated by the CP2 Center by a manual survey, and by drone photography. Texture meter readings were also done for most of the PESs, both before and after the asphalt rubber seal coats.

**Asphalt Rubber (Type II) and (Type III) Test Section Applications**

Application details for the various seal coat test sections are shown in Table 2.

**Table 2. Asphalt Rubber (Type II) and (Type III) Test Section Applications**

Asphalt Rubber (Type II) and (Type III)	SR 139	SR 299
Binder Application Target Rates	0.58 gal/yd <sup>2</sup>	0.58 gal/yd <sup>2</sup>
Application Temperatures	400°F AR (Type II)	400°F AR (Type II)
Application Temperatures	385°F AR (Type III)	400 to 403°F AR (Type III)
Construction Dates	6/15/2021	6/23/2021
Notes	Very efficient operation	Very efficient operation

The binder distributor truck and chip spreader are shown in Figures 1 and 2, and use of the Texture Meter is shown in Figure 3.



**Figure 1. AR (Type II) Being Applied on SR 139**



**Figure 2. Chip Spreader used for Hot Precoated Chip Applications**



**Figure 3. Texture Meter in use on AR (Type III) on SR 299**

**Laboratory Testing**

As part of these pilot projects, laboratory Vialit testing is being performed to evaluate chip retention and adhesion for both the AR (Type II) and AR (Type III). Both Caltrans and the CP2 Center are also performing tests to determine various properties of the binders used on these pilot projects. The laboratory tests will be compared with the contractor’s test data.

**Field Performance**

These projects are too new to evaluate field performance. Previous projects had a one-year field review, and it is proposed that these projects also have a one-year field review. It is expected that the AR (Type III) will out perform the AR (Type II) in the cold weather in this high desert climate region. In particular, the AR (Type III) may be more resistant to snowplow damage. Long term monitoring will determine if this is true.

**Summary**

The contractor, APS, made these projects run smoothly due to having a well-trained crew that coordinated

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their construction activities. Certificates of Compliance for the materials, and daily quantities were furnished to Caltrans in a timely manner. The contractor's equipment and blending plant all appeared to be new and in excellent condition. There was an adequate number of haul trucks for materials, so delays were minimized.

The CP<sup>2</sup> Center provided technical support during the construction of these pilot projects and will continue to support Caltrans in post construction evaluations and laboratory testing. Completed project reports will be available on the CP<sup>2</sup> Center's website at a later date. For more information, please contact Dr. Dingxin Cheng at [dxcheng@csuchico.edu](mailto:dxcheng@csuchico.edu)



## Targeted Overlay Pavement Solutions (TOPS)

From FHWA News Release on August 30, 2021

More than 40 percent of major roads in the United States are in poor or mediocre condition. The U.S. Department of Transportation's 2015 Conditions & Performance Report estimated that America needs more than \$800 billion to fix highways and bridges. By enhancing overlay performance in priority locations, State and local highway agencies can help ensure safer, longer-lasting roadways.

Improved overlays are now available for both asphalt and concrete pavements that enable agencies to provide long-life performance under a wide range of traffic, environmental, and existing pavement conditions. FHWA's Targeted Overlays Pavement Solutions initiative (TOPS), encourages agencies to maximize their investment by using overlays in high-maintenance locations such as primary or interstate pavements, intersections, bus lanes, ramps, and curves.

The TOPS team is promoting eight asphalt overlays and two types of concrete overlays that offer many benefits. These overlays reduce maintenance, maximize previous investments through extended service life of pavement structures, and reduce user delays (fewer work zones). In addition, certain overlays increase skid resistance, improve resiliency in flood-prone areas, reduce splash and spray, and reduce noise.

Asphalt overlay mixtures such as stone matrix asphalt, polymer-modified asphalt, and other materials and agents reduce rutting, increase cracking resistance, and extend pavement life.

- Asphalt Overlays
  - \* Asphalt rubber gap-graded
  - \* Crack attenuating mix
  - \* Enhanced friction overlay
  - \* Open-graded friction course

- \* Highly modified asphalt
- \* Stone matrix asphalt
- \* High-performance thin overlay
- \* Ultra-thin bonded wearing course
- Concrete on Asphalt
- Concrete on Concrete
  - \* Bonded
  - \* Unbonded



The TOPS team provides technical assistance to help transportation agencies select the right overlay product for the right location. The team has created fact sheets<[HERE](#)> on different types of overlays and will release several case studies and how-to documents later this year. View the TOPS EDC overview video at: <[HERE](#)> and stay tuned for information on additional webinars and workshops.

To learn more about Targeted Overlay Pavement Solutions (TOPS), contact Tim Aschenbrener<[Timothy.Aschenbrener@dot.gov](mailto:Timothy.Aschenbrener@dot.gov)> (asphalt) and Sam Tyson<[Sam.Tyson@dot.gov](mailto:Sam.Tyson@dot.gov)> (concrete), EDC-6 team co-leads or visit the team's EDC website<[HERE](#)>.



# PCC Rehab Project in Concord

By Charles Stuart, Southwest Concrete Pavement Association (SWCPA)



Caltrans and Vanguard Construction recently performed an accelerated pavement rehabilitation project on State Highway 242 in Concord, California, thanks to an innovative concrete mix, extensive advance communications, and superb scheduling.

SR 242 is a heavily traveled Bay Area route that runs directly through the City of Concord, connecting northbound Interstate 680 with State Route 4 to the easterly destinations of Pittsburg and Antioch. Conversely, SR 242 connects westbound SR 4 with southbound I-680. Adjacent to the intersection with I-680 is the Sun Valley Shopping Center, Six Flags Hurricane Harbor, a casino, and a regional airport. Aiding in the avoidance of a traffic nightmare, northbound I-680 served as a detour to connect with eastbound SR 4.

In just 120 hours, over the two consecutive weekends of July 9th and July 16th, Caltrans and Vanguard replaced 3,500 linear feet of concrete pavement in lanes two and three of northbound State Route 242 in the City of Concord safely - and without causing any traffic congestion or delays. Northbound SR 242 was completely closed over the two weekends, along with the affected on- and off-ramps. Without the closures, the project would have taken a full month.

The project was originally planned to be precast pavement sections to expedite the job, but the Vanguard team, motivated by a value-engineering bonus, experimented with the mix design and was able to transition the project to Continuously Reinforced Concrete Pavement (CRCP) using conventional Portland cement concrete (PCC). The conventional concrete mix was modified to achieve "drive-on" strength in just 20 hours, which is about three to five days faster than most highway paving mixes.



Crew installs rebar mats

It's important to note that this conventional Portland cement concrete mix is not classified by Caltrans as Rapid Strength Concrete.

The Caltrans team, headed up by Chris Havel, extensively coordinated the scheduling of the project with the cities of Concord and Martinez, and communicated the two-weekend closure of SR 242 through highway message boards, the Caltrans website, Google Maps, and other traffic monitoring apps. Other members of the Caltrans team include Area Construction Manager Andrew Baskerville, Project Manager Gez Tizazu, Senior T.E. Civil Naga Adibhatla, Project Engineer Manny Canilao, Resident Engineer Amir Hatefi, and Materials Engineer Mohammad Zabolzadeh.

To prepare for the project work, overnight crews performed preliminary saw cutting on the pavement that was to be replaced in northbound lanes two and three. When the route closure took place, three excavation crews simultaneously extracted the old, prepped pavement sections to save time.



Concrete Paving Machine working in Lane 3.

Vanguard set up a portable batch plant in the Caltrans maintenance yard in Pacheco, just a short distance away, minimizing transport time of the concrete. To meet the aggressive schedule, 50-member crews were on the job each weekend.



Night crew placing concrete

The Vanguard Project Team included Bob Purdy, Area Manager, Mike Hepner, Project Manager, Jackson Lacombe and Enrique Aguilar.

Work moved at a rapid, but measured pace over the course of the two weekend closures. The project successfully completed on Monday, July 19th, with just a small amount of texturing work remaining to be done.

Weekend closures, like the ones implemented

for this project, have become commonplace in Southern California and are now gaining popularity in the San Francisco Bay Area thanks to the resultant reductions in congestion and traffic disruptions over the long haul.

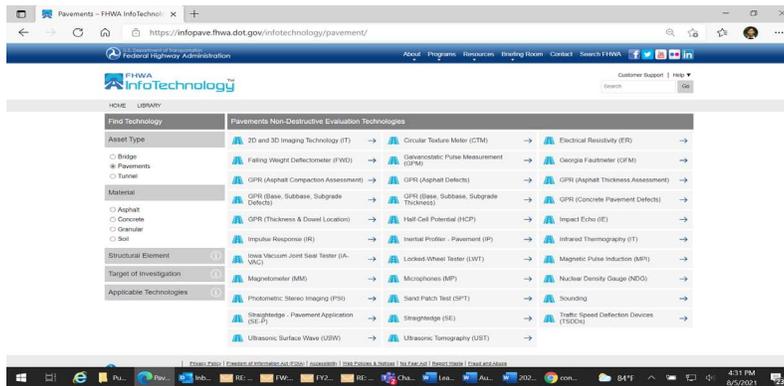
For more information contact Charles Stuart, Southwest Concrete Pavement Association (SWCPA) at: [cstuart@swcpa.org](mailto:cstuart@swcpa.org)



## FHWA Update

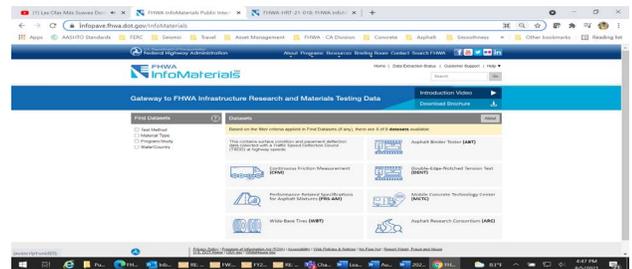
FHWA launched a new web portal – InfoTechnology, which is a knowledge database that helps agencies, academia, and industry learn and explore about Non-Destructive Evaluation (NDE) Technologies used to assess highway bridge, tunnel, and pavements components. This web portal offers a great user interface to include a variety of NDEs. In the future, FHWA may include Structure Health Monitoring technologies amongst others. Please explore and view the web portal for Pavements NDE at:

[Pavements – FHWA InfoTechnology \(dot.gov\)](https://infopave.fhwa.dot.gov)



## By Chu Wei, FHWA – Sacramento

FHWA also has launched another web portal – InfoMaterials, which is a centralized gateway to infrastructure research and materials testing data. It provides easy access to FHWA's infrastructure research and materials testing data. The material testing data is collected through FHWA, State, and other national efforts. More data and additional datasets will be included when they become available.



To learn more about InfoMaterials, please visit the brochure: <https://infopave.fhwa.dot.gov/InfoMaterials/Content/Documents/Brochure.html>. To explore and view the dataset, go to the FHWA InfoMaterials website: <https://infopave.fhwa.dot.gov/InfoMaterials>



## 'Greenbook' Update

The 2021 Edition of the Standard Specifications for Public Works Construction ("The Greenbook") is now available from the publisher, BNi Publications, [www.bnibooks.com](http://www.bnibooks.com). The Greenbook is published every three years. A yearly supplement is no longer published.

The 2021 Edition incorporates very few changes, in particular to pavements. Three subsections in the 2018 Edition have been removed due to the lack of usage; 203-10, Latex Modified Asphalt Concrete, and 203-11 and 302-11, Crumb Rubber Modified Asphalt Concrete Gap-Graded (materials). The latter two were specifications for the "dry process" rubberized asphalt concrete.

Changes were also made in the specifications

## By Erik Updyke, CP<sup>2</sup> Center

for slurry seal and microsurfacing materials and production. Separate subsections are now included for aggregate in Subsection 200-1. Materials and production requirements were moved from Part 2 to Part 3 to conform to The Greenbook's editorial structure which includes requirements for both construction methods and field-produced materials in Part 3. Material and production requirements for rubberized emulsion-aggregate slurry (REAS) remain in Part 2, as REAS is produced at a central plant. The basis of measurement and payment for slurry seal was also revised from individual measurement by weight of emulsion and each Type of aggregate, to the combined tonnage ("wet ton"), similar to the basis in the Caltrans Standard Specifications. *Continued, next page*



The Greenbook Committee's Asphalt Concrete Task Force meets the first Wednesday of each month in the afternoon. Current discussion includes Change No. 301SM, which updates and revises

Subsection 302-5, Asphalt Concrete Pavement. For further information, contact the Chair, Corina Wong at: [corina.wong@gcinc.com](mailto:corina.wong@gcinc.com).



## CalAPA Update - Fall Conference Coming

By Russell Snyder, CalAPA



Registration is open for the annual Fall Asphalt Pavement Conference to be held on Wednesday, Oct. 13 in Sacramento. The premier event of its type is in its 12th year and features a diverse lineup of speakers covering everything from recycling asphalt, local agency pavement specifications, environmental regulations, legislative matters and funding projections. Details and on-line registration is [HERE](#).

The keynote speakers include National Asphalt Pavement Association President & CEO Audrey Copeland, Federal Highway Administration Division Administrator Vince Mammano and Caltrans District 3 Director Amarjeet Benipal, who formerly was State Pavement Engineer. All three will give a 360-degree view of the public works funding situation, including the federal infrastructure bill, and how it will impact California.



CalAPA's Sacramento lobbyist, Jeff Sievers, will provide an insider's view of the Legislature, the aftermath of the gubernatorial recall and next year's elections.

The conference also will feature compelling technical presentations on best practices with regard to Reclaimed Asphalt Pavement (RAP) design, construction and the use of RAP rejuvenators. Caltrans State Materials

Caltrans' Amarjeet Benipal

Engineer Tim Greutert will provide the state perspective on construction materials testing and acceptance issues, and the conference will also delve into an updated asphalt specification developed specifically for local agencies.

Because so much is changing with regard to air- and water-quality regulations, the conference will feature an all-star panel discussion featuring industry and agency experts on what is new and what is on the horizon. A detailed agenda is [HERE](#).

As usual, the conference will include a tradeshow floor and ample time for attendees to learn about new products, services, equipment and technology, and to make new friends and re-establish connections with old ones. An event brochure with sponsor-exhibitor information is [HERE](#). Contact Sophie You of CalAPA for details at (916) 791-5044.

There are a limited number of rooms reserved at the Hilton Sacramento Arden West Hotel at a special discounted rate of \$149 per night for those attending the Conference. Contact the Hilton Sacramento Arden West directly at (800) 445-8667 for details. Guests who call the reservation line must identify themselves as part of the "California Asphalt Pavement Association" function to be eligible for the conference rate.

For more information go to : [www.calapa.net](http://www.calapa.net)



## CCPIC Update

By John Harvey (UCPRC), Laura Melendy (UC Berkeley, Tech Transfer), and Gary Hicks (CP<sup>2</sup> Center)



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's work 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). All are involved with CCPIC.

The following provides an update on recent accomplishments and future plans of the CCPIC.

1. **Training** CCPIC will continue to offer all classes online via the Tech Transfer Center at U.C. Berkeley. A 'group discount rate' is 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:

- CCC-02 Asphalt Pavement Preservation Treatments, Materials, Construction and Quality Assurance, October 25-28, 2021
- 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 Construction Specifications and Quality Assurance (February 8-16, 2022)
- CCC-22 In-place Recycling
- CCC-23 Gravel Roads Engineering, Construction & Management

As the core courses for the Pavement Engineering and Management Certificate are being completed and offered for the first time by early 2022, the CCPIC governance board of city and county pavement officials has requested development of a new Pavement Construction Inspection Certificate. This new certificate 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](http://www.techtransfer.berkeley.edu/schedule)

2. **Technical Guidance and Tools** Efforts completed or underway on Technical Guidance and Tools include:

Best Practices for Pavement:

- Writing and enforcing specifications for asphalt compaction - completed
- Writing concrete mix specifications to improve durability and sustainability - completed
- 'Unpaving' to Create Affordable, Safe, Smooth Gravel Roads - completed
- Pavement Condition Index - completed

Tools and Model Specifications

- Pavement life cycle cost analysis spreadsheet software - completed
- Asphalt Compaction Model Specification Language - completed
- Concrete Pavement Model Specification Language - completed
- Superpave Mix Design for Local Government (SPLG) - completed draft is posted and looking for local agencies to pilot
- Tack coat specification - near completion

All completed guidance and tools are posted on the CCPIC website: [www.ucprc.ucdavis.edu/ccpic](http://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](mailto: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.

*Continued, next page*

We are looking for informal self-identification. To get on the list send an email to [ccpic@ucdavis.edu](mailto: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](mailto:ccpic@ucdavis.edu) .



## WRAPP Update



The Western Regional Association For Pavement Preservation (WRAPP) has completed another successful round of training for Caltrans personnel. Sallie Houston, with Arkema, gave an "Emulsions 101" presentation to the group. Next up will be training on 'Multi-Layer Treatments'.

The WRAPP Conference/Workshop is set for February 2-3, 2022 at the Holiday Inn in Sacramento and the agenda will be released this month! The conference will be a 'virtual/hybrid' conference, and we look forward to continuing to provide expertise and education on all the financial and environment benefits of Pavement Preservation.

### ***Nationwide Polymer Shortages Severely Impacting CA Emulsion Industry***

The WRAPP Board has put out a letter addressing the latex shortage happening around the nation. This is a huge problem for WRAPP membership and contractors being able to complete their work for the year, and the potential financial risks are high. WRAPP is making an effort to spread the word to City & County Agencies and State DOT's.

The polymers used to make polymer modified emulsions (PME) are in short supply and is negatively impacting the industry. Styrene and butadiene are the two most prevalent materials used to make our polymer modifiers. As the demand for PME's reaches its' peak (August/September here in CA), three of the top five butadiene suppliers have declared 'force majeure' this month. During the winter, styrene suppliers

### ***By Cesar Lara, WRAPP President***

also declared force majeure following the freeze in Texas that impacted production. Additionally, chlorine (one of the key chemicals for manufacturing cationic PME) has been in very short supply.

This has created a perfect storm for contractors and suppliers trying to deliver projects and manufacture PME's. The other factors contributing to this storm are:

- worldwide "off the chart" increases in demand for raw materials
- trucking and railcar shortages and delays
- ongoing labor shortages due to Covid 19

This storm has been brewing and growing since the winter, and it does not seem as if it will end this year. Rail deliveries used to take 10-14 days. Today, if you can get a railcar, the timing is sometimes 30 days plus, and there is no trucking to fall back on due to ongoing Covid labor shortages. Any overseas styrene butadiene or natural rubber that does make it to the US is being absorbed quickly by the tire and other competing industries.

These shortages will not end anytime soon and it is affecting many different industries. It will persist through the rest of the season and possibly into next year until the industry can catch up from these setbacks. Contractors may have to use force majeure if they are unable to get supplies of materials needed to make PME's. Agencies should consider alternative emulsion products and should work with their contractors to get through this crisis.

For more WRAPP information go to: [www.wrapp.org](http://www.wrapp.org)



## 2021 RMWPPP Virtual Meeting

***By Kevin Robertson (AZDOT), Timothy Ernest (Oregon DOT) and R. Gary Hicks (CP<sup>2</sup> Center)***

The Rocky Mountain West Pavement Preservation Partnership (RMWPPP) held its annual meeting 'virtually' on May 27, 2021. Topics covered by a panel of members include presentations on life extension by Arizona DOT, chip seal performance tests and new specifications from

Oregon DOT, and challenges facing the agencies.. John Coplantz of Oregon DOT moderated the panel, while panelists included Mary Gayle Padmos (Montana DOT), Jerry Dankbar (City of Roseville CA), and Kevin Robertson (Arizona DOT). *Continued, next page*

Information on the RMWPPP organization and past meetings can be found at <https://tsp2pavement.pavementpreservation.org/rocky-mountain-west-rmwppp/>

President Scott Gibson of Washoe County Nevada opened the meeting and introduced the speakers. Kevin Robertson started the program by discussing the Arizona DOT's program on Pavement Preservation by discussing pavement life extension treatments. Pavement preservation included planned activities to sustain and extend the useful life of the existing pavement. The goal is to keep a 'good road good' as is shown in Figure 1.

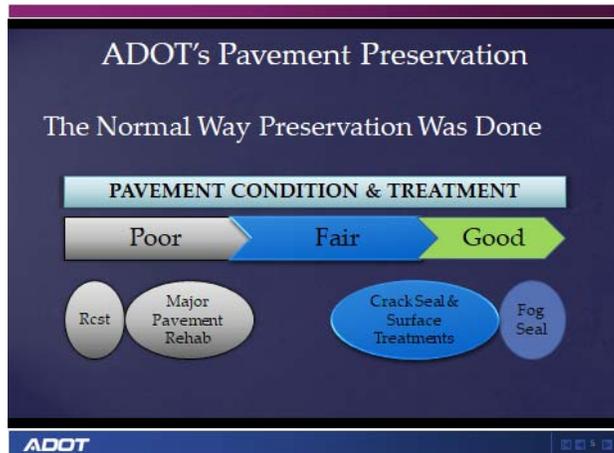


Figure 1. ADOT's old approach to preservation

Arizona modified this approach to include treatments for pavements in the 'Fair' range as shown in Figure 2.



Figure 2. ADOT's new approach to preservation

As can be seen, more robust life extension treatments can be applied to pavements in fair condition, which included Cape seals, thin bonded overlays, and asphalt rubber open-graded friction courses. Possible future projects may include highly polymer modified chip seals, scrub seals and Cape seals, with RAP used in the chip seal and microsurfacing. For more information on this program, please contact Kevin

Robertson at [krobertson2@azdot.gov](mailto:krobertson2@azdot.gov).

Oregon DOT embarked on a program of continuous improvement dealing with chip seals for lower volume roads (5,000 ADT or less). This involved improving the program management, chip seal specifications and chip seal design. The program has been in place since 1999 and is funded by state funds to the tune of \$13.5 million per year. These projects rarely saw any STIP funding. In 2012, funding was made available thru STIP for roads from 5,000 to 8,000 ADT. Projects are selected using PMS data, which is verified prior to construction. Advance work prior to construction includes rock crushing (Figure 3) and crack sealing and patching.



Figure 3. Stockpiling aggregates for chip sealing

Also, as a part of a research study with Iowa State University, a chip seal performance specification was developed to improve chip seal performance in the state of Oregon. The research study can be found at [https://www.oregon.gov/odot/Programs/ResearchDocuments/chip\\_seal\\_final.pdf](https://www.oregon.gov/odot/Programs/ResearchDocuments/chip_seal_final.pdf).

The new specification includes the following:

- The contractor is responsible for setting application rates (using the McLeod method), placing and finishing the chip seal, repairing failures, and meeting or exceeding performance.
- The inspection role is no longer that of a construction observer. The inspector no longer directs rates or construction methods or quality control. Inspections take place 2 weeks after construction and at 1 year after construction.
- Incentives/disincentives are based on performance measurements. The performance measure includes macrotexture as measure by the sand patch method. (Figure 4)



Figure 4. Sand patch tests

Oregon DOT feels this is important as it is expected to;

- Encourage innovation in materials and construction
- Provides a rational way to setting emulsion and aggregate application rates, and
- Increase service life

The specification was approved for pilot projects in 2020 and ODOT would like to see contractors placing chip seals become certified. For more information on this project, please contact *Timothy Earnest* at [Timothy.Earnest@odot.state.or.us](mailto:Timothy.Earnest@odot.state.or.us)

The technical program concluded with a panel discussion (AZDOT, City of Roseville, CA, and Montana DOT) on challenges to pavement preservation. Some of the national challenges identified in a recent National Center for Pavement Preservation (NCP) survey included the following;

- Funding
- Buy-in and perception of pavement preservation treatments
- On-time delivery
- Workmanship and quality
- Using data to make decisions
- Structural needs
- Having sufficient contractors

The next meeting for the RMWPP is expected to be in person and in Albuquerque, New Mexico on September 27-29, 2022. The meeting was closed by the new chairperson, Kim Scofield of Washington DOT.

Information on the RMWPPP organization and past meetings and can be found at: <https://tsp2pavement.pavementpreservation.org/>  [rocky-mountain-west-rmwppp/](https://rocky-mountain-west-rmwppp/) .

## CSU-Chico Civil Engineering and CP2 Center hosted Summer Asphalt Workshop for College Students

By Kun Zhang, Steffen Mehl, DingXin Cheng, CSU, Chico

The Department of Civil Engineering at California State University (CSU)-Chico and California Pavement Preservation (CP2) Center hosted a summer workshop on Asphalt Pavement Technology and Material Tests for college students on July 20-22, 2021. Student participants were from Butte College and CSU-Chico. The workshop was sponsored by the American Public Works Association (APWA) - Sacramento Chapter, which also supported upgrading the Civil Engineering Materials Lab ( See [Dec 2020 newsletter](#)). Mr. Rick Liptak, CEO of Dokken Engineering, served as the representative for APWA-Sacramento Chapter to make opening remarks for this workshop.

This three-day workshop aimed to promote transportation workforce development for public works by introducing state-of-practice knowledge and training on asphalt paving technology and pavement materials testing following the AASHTO and Caltrans testing methods. Dr. Kun Zhang lectured on various topics of Introduction to Pavement Engineering,

Aggregate, Asphalt Binder, Superpave Mix Design, Recycling of RAP and RAS, Balanced Mix Design, and Asphalt Plant Production and Field Compaction. Dr. DingXin Cheng lectured on Pavement Preservation. Participants completed extensive hands-on labs over the three days, including Aggregate Gradation, Fine Aggregate Angularity, Specific Gravity of Coarse and Fine Aggregates, Rotational Viscosity of Asphalt Binders, Performance Grade Tests of Asphalt Binders using Dynamic Shear Rheometer and Bending Beam Rheometer, and Superpave Mix Design Tests of Asphalt Mixtures in terms of Mixing, Gyrotory Compaction, Gmm, Gmb, and Indirect Tensile Strength.

We will continue to recruit student participants from community colleges in northern California to attend the asphalt workshop and invite industrial partners to present in future events. If you are interested to participate or sponsor this event, please contact Dr. Kun Zhang at [kzhang2@csuchico.edu](mailto:kzhang2@csuchico.edu). We very much appreciate your support! 



## COMING EVENTS - Mark Your Calendar!

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



### TECH TRANSFER

#### U.C. Berkeley Technology Transfer Courses (Online Training)

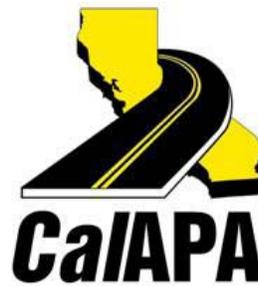
These courses were developed in partnership with the City and County Pavement Improvement Center (CCPIC) and funded by California Senate Bill 1, the Road Repair and Accountability Act of 2017.

- 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  
New classes in the works for 2022 include:
- CCC-03 Pavement Construction Specifications and Quality Assurance (February 8-16, 2022)

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

#### CalAPA Conference

October 13 (Sacramento)



Registration is open for the annual Fall Asphalt Pavement Conference to be held on Wednesday, Oct. 13 in Sacramento. The premier event of its type is in its 12th year and features a diverse lineup of speakers covering everything from recycling asphalt, local agency pavement specifications, environmental regulations, legislative matters and funding projections. Details and on-line registration is [HERE](#).

For more information go to: [www.calapa.net](http://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/>



U.S. Department  
of Transportation  
**Federal Highway  
Administration**



**NATIONAL ASPHALT  
PAVEMENT ASSOCIATION**

**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. Webinars in conjunction with FHWA are tentatively scheduled for the third Thursday of each month at 2 p.m. (EST) as follows:

- Nov. 18 CIR/CCPR Mix Design Guidelines and Practices
- Dec. 16 How to Construct High Quality Slurry/ Microsurfacing Treatments

Registration: <https://connectdotcqp1.connectsolutions.com/content/connect/c17/en/events/catalog.html?folder-id=1296478025&from-origin=connectdot.connectsolutions.com>

Find more information and dates contact: *Jason. Deitz@dot.gov*

**The Asphalt Institute and NAPA Webinars (Online)**

The Asphalt Institute offers national training on pavement design, asphalt binders, mix 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>



**Disclaimer: Caltrans does not endorse any industry products or services, and the contents of newsletter articles reflect the views of the authors and do not necessarily reflect the official views or policies of Caltrans, the CP<sup>2</sup> Center, or the State of California.**

Caltrans established the California Pavement Preservation (CP<sup>2</sup> Center) at CSU, Chico in July 2006, and fully funded the Center in January 2007. Dr. DingXin Cheng is the current Director of the Center. Mr. Rukesh Maharjan is the current contract manager of Caltrans.

The purpose of the Center is to provide pavement preservation support services to Caltrans and other public agencies, and to industry. Unique services include developing educational programs in pavement preservation, providing training and staff development opportunities, providing needed technical assistance to public agencies and industry, and managing/conducting research and outreach services, such as this newsletter.

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