Solving Chain Wear on Concrete Pavements

Caltrans is piloting the use of UHPC in an effort to find a solution to chain wearing issues on I-80 in the high mountain Truckee area within District 3.

MTAG Update in Progress

The Caltrans Maintenance Technical Advisory Guide (MTAG) has been the go-to reference for pavement maintenance since 2003. The CP2 Center is playing a major role in updating the MTAG.

NGCS for Quieter PCC Pavement Surfaces

The Next Generation Concrete Surface (NGCS) is the quietest non-porous concrete pavement surface with a hybrid texture that resembles a combination of diamond grinding and longitudinal grooving.

CCPIC Update

The City County Pavement Improvement Center (CCPIC) has recently reached a new milestone in the offering through Berkeley Tech Transfer of the first self-paced classes.

CalAPA Spring Conference

The California Asphalt Pavement Association (CalAPA) Spring Asphalt Pavement Conference, held the week March 6-8 in Ontario, attracted hundreds of professionals to learn the very latest, network and have fun.
PCCAS Meeting Highlights

Representatives from State DOTs in California, Nevada, Oregon, and Washington, and FHWA Western Federal Lands (WFL) were present along with representatives from the asphalt industry. The CP2 Center is an Associate Member of this Conference.

### UPCOMING EVENTS

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<tr>
<td>NAPA Webinars</td>
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<td>SWCPA Concrete Pavement Workshops</td>
<td>Various Dates</td>
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<td>RMWPPP</td>
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### Berkeley Tech Transfer / CCPIIC Pavement Classes

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### CalAPA Classes

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<td>“Quality Asphalt Paving”</td>
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Solving Chain Wear on Concrete Pavements  
By Reimond Garcia, Caltrans

Interstate 80 (I-80) is a vital arterial of California’s transportation system that connects the east and west coasts, spanning from California to New Jersey. The section of the corridor that traverses through the Sierra Nevada mountains faces a constant barrage of wear and tear from high truck traffic, tourism, and heavy snowfall during the winter seasons. These factors contribute to extensive wear and tear on the pavement surface, particularly due to the frequent use of tire chains in winter, leading to a recurring issue of pavement degradation in wheel paths – especially in truck lanes.

Current corrective action to address wheel path surface wear within concrete pavement due to chain wear has been to grind and backfill voids with polyester concrete. This scope of work is commonly referred to a “polyester concrete inlay” and is done via a Non-Standard Special Provision (NSSP) in Section 41 “EXISTING CONCRETE PAVEMENT” of the Caltrans Standard Specifications.

![Polyester Concrete Inlays on I-80 near Truckee](image1)

Although dependent on numerous factors, recent discussions with District 3 (Marysville) Construction have indicated that the polyester concrete inlays last between 3-5 years. In an effort to find a wheel path replacement material with increased durability and performance, thus reducing traffic delays to the public and frequent construction on I-80, a team comprised of District 3 Materials, Materials Engineering and Testing Services (METS), and the Office of Concrete Pavements within the Pavement Program are piloting the use of Ultra High-Performance Concrete (UHPC) inlays on I-80.

Per the Federal Highway Administration, “UHPC is a cementitious composite material composed of an optimized gradation of granular constituents, a water-to-cementitious materials ratio less than 0.25, and a high percentage of discontinuous internal fiber reinforcement.” The mechanical properties of UHPC include compressive strength greater than 17,500 psi and tensile strength greater than 750 psi.

A Director’s Order (03-0L2604) is currently being utilized to address chain wear issues, failing concrete slabs, and drainage work on I-80 in Nevada County at various locations between Postmile 0-16.5. The pilot project locations will reside within the postmiles of the Director’s Order and construct three separate 500-foot trial sections with each utilizing a different proprietary UHPC material.
Each trial section with homogeneous deteriorated wheel paths will provide a minimum UHPC inlay thickness and to provide a homogeneous material for the UHPC to adhere to. Each trial section will require a mockup from the Contractor to demonstrate constructability and verify specific material properties are obtainable in the field.

Monitoring and evaluation of the UHPC trial sections and previous polyester concrete sections will be done on an annual basis. The performance and effectiveness of the UHPC inlays on the segments of I-80 that are known to experience significant chain wear will be evaluated. Wearing depths and visual observations will be recorded on an annual basis.

The use of UHPC on I-80 may represent a promising solution to tackle persistent chair wear issues in the region. By harnessing the strength and durability of UHPC, we are optimistic to maintain smoother, more resilient roadways that enhance safety, reduce maintenance cost, and improve the overall driving experience of Californians statewide.

For more information contact Reimond Garcia with Caltrans at: reimond.garcia@dot.ca.gov
Since its first publication in 2003, the Caltrans Maintenance Technical Advisory Guide (MTAG) has been a go-to reference for all aspects of pavement maintenance. The ‘MTAG’ is often referred to as the pavement maintenance ‘Bible’, but updates are needed. Its last update was in 2009. So an updating effort has begun, with the CP2 Center playing a major role as part of our support work for Caltrans.

The MTAG has been a 2-Volume reference - Volume 1 is for Flexible (Asphalt) Pavement Preservation, and Volume 2 addresses Rigid (PCC) Pavement Preservation. The Guides cover a lot. The full Caltrans Guides can be found at: https://dot.ca.gov/programs/maintenance/pavement/mtag

Our updating work will be limited to Volume 1, which currently has 14 Chapters addressing topics including: Pavement Preservation Concepts, Materials, Strategy Selection, Crack Sealing, Patching, Fog Seals, Chip Seals, Slurry Seals, Microsurfacing, Multilayer Systems, Thin Overlays, Bonded Wearing Courses, Interlayers, and In-Place Recycling. It’s a very comprehensive Guide!!

The CP2 Center has been assigned the task, from Caltrans, of updating this valuable reference, and work is progressing. Subject Matter Experts (SME) within both Caltrans and Industry have been identified for input.

For more information contact Gary Hicks, Program Manager, at: rghicks40@outlook.com
According to the Southwest Concrete Pavement Association (SWCPA), the Next Generation Concrete Surface (NGCS) is the quietest non-porous concrete pavement surface available. NGCS is a hybrid texture that resembles a combination of diamond grinding and longitudinal grooving.

NGCS Grinding on PCC

NGCS consists of a uniform land profile design with essentially an all-negative texture. Despite its flatter, smoother riding surface compared to traditional portland cement concrete pavement (PCCP), the NGCS still possesses and maintains reliable microtexture (friction) when constructed with quality aggregates. The longitudinal grooves provide substantial macrotexture and increase resistance to hydroplaning by providing escape channels that allow water to move out of the tire contact patch area. NGCS is typically constructed as a two-pass operation using diamond-tipped saw blades mounted on conventional diamond grinding (CDG) and grooving equipment.

(This article was originally authored by Mark Gudenas, Communications Director of the Southwest Concrete Pavement Association (SWCPA), and published in SWCPA’s monthly bulletin, Innovation Highway.)

Here’s a link to the full article about California and other states use of NGCS: https://72aeb35d-270f-43cf-a58b-ddde7e42coeb.usrfiles.com/ugd/72aeb3_b8812f725b614f3ba5cebccc24d79f742.pdf


CCPIC Update

By Erik Updyke, P.E., CCPIC

The City and County Pavement Improvement Center (CCPIC) Governance Board met on May 9. John Harvey, Executive Director, led the discussion. Elmer Datuin from Riverside County was welcomed as a new member representing the County Engineers Association of California. A vacancy currently exists for a member representing the League of California Cities.

Jay Johnson from Berkeley Tech Transfer reported on course enrollment and offerings in the Pavement Engineering and Management (PEM) and Pavement Construction Inspection (PCI) Certificate Programs. Enrollment for both online and self-paced (taken at the convenience of the enrollee) courses has been strong. A new self-paced class is now offered, CCB-21, Financing and Cash Flow for Pavement Networks with instructor Russ Branson. Two other self-paced classes currently offered are CCI-06, Construction Inspection of Asphalt Rubber Pavement Materials with Instructor Mike Robinson and CCI-04, Pavement Preservation Construction Inspection with Instructor Lance Brown. Both have been very popular. (See the CCPIC website below.) Three more self-paced classes will be offered in the near future.

John Harvey and Erik Updyke discussed the current technical projects, which include the development of a Site Investigation Guide for Cities and Counties, which is in the draft stage, and the development of a California mechanistic-empirical (CalME) pavement design catalog, which is in progress. A review of research, studies and agency policies for utility trench restoration has recently been completed, and an accompanying PowerPoint presentation developed. A PowerPoint presentation on warm mix asphalt (WMA) has also been recently developed.

Erik discussed the general scope of each of the four technical consultations recently provided to the Cities of San Marcos, Carlsbad, Gilroy, and Pasadena.

Since the Governance Board meeting, John and Erik spoke at the League of California Cities Roundtable discussion on pavement on May 15. John discussed the CCPIC and gave a brief technical discussion on the proper use of pavement condition index (PCI). An open question and answer session followed with many questions submitted. The event was well-received.

Further information about the CCPIC and the PEM and PCI Certificate Programs is available on the CCPIC website, https://www.ucprc.ucdavis.edu/ccpic/. If you have any questions or wish to schedule a presentation, please contact me, eupdyke@ucdavis.edu.
CalAPA Spring Conference

The California Asphalt Pavement Association (CalAPA) Spring Asphalt Pavement Conference, held the week March 6-8 in Ontario, attracted hundreds of professionals to learn the very latest, network and have fun.

The annual event, held at the DoubleTree Hotel in Ontario, kicked off March 6 with an "Asphalt Pavement 101" class taught by former senior Caltrans materials engineer Roger Smith, attended by industry and agency personnel. The Women of Asphalt California Branch, meanwhile, sponsored a tour of a Pavement Recycling Systems (PRS) facility in Colton. The tour came on the heels of PRS hosting a joint Caltrans-industry liaison meeting at their Headquarters in Jurupa Valley on March 5.

Day 1 of the Spring Conference, on March 7, featured presentations by Caltrans Deputy District 8 (Riverside & San Bernardino counties) Director Haissam Yahya, outlining department priorities and the construction program for the Inland Empire. Sean Devine, CEO of X-B-E, Inc., followed up with an eye-popping demonstration of the capabilities of the "Hey NAPA" AI-powered research tool, and other artificial intelligence (AI) capabilities. The "Hey NAPA" tool, with strictly curated content linked to original source material, is just one example of the many AI-powered practical applications that are coming on line.

Erik Updyke, P.E., Program Manager for the SB1-funded City & County Pavement Improvement Center, walked attendees through the wealth of resources developed to help local agencies manage their pavement assets, including many educational resources, model specifications and more. A detailed cover story in a recent issue of CalAPA's association magazine, California Asphalt, profiled the CCPIC HERE. The CCPIC website is HERE.

Dr, Shadi Saadeh with Cal State Long Beach, program manager of the Joint Training & Certification Program for construction materials technicians, a joint effort between Caltrans, academia and the construction industry, discussed how the program has trained thousands of technicians since the program's inception in 2018, and summarized new enhancements to the classes coming up this year. CalAPA in 2014 spearheaded the effort to create the JTCP, and is a member of the JTCP Advisory Council. A California Asphalt magazine story about a tour of the JTCP program in Long Beach conducted for a member of the Legislature is HERE. The main JTCP website is HERE.

Innovation was a recurring theme of the conference, with presentations by Alex Richardson with HaulHub and Joseph Dongo of Caltrans on eTicketing technology, and Scott Dmytrow with PavementACES demonstrating pavement preservation tools that are benefitting from new technology.

Sustainability was also prominently featured in presentations by Dan Staebell with Cargill, delving into Warm Mix Asphalt and best practices with regard to the use or rejuvenators in the use of reclaimed asphalt pavement (RAP).

Chris Sparks with MacRebur provided an update on the use of reclaimed plastic in asphalt pavement mixes. Amlan Mukherjee with WAP Sustainability, a noted national expert on Environmental Product Declarations (EPD), provided the latest information on this high-interest topic. EPDs were featured on the cover of California Asphalt magazine's most recent environment-themed issue HERE.
Day 2 of the conference featured presentations from Buzz Powell (pictured), recently named technical director of the CalAPA-supported Asphalt Pavement Alliance (APA), drawing from his many years of managing the test track at the National Center for Asphalt Technology at Auburn University. Dr. John Harvey, Director of the University of California Pavement Research Center (UCPRC) joined Erik Updyke for informative presentations targeting pavement performance, as well as the latest research on the use of RAP and Rubberized Hot Mix Asphalt.

The Women of Asphalt California Branch demonstrated their technical chops by moderating an expert panel discussion on recycling asphalt in-place, utilizing various techniques. Barros moderated the panel discussion, which also featured Larry Hernandez with Caltrans, Dr. Dave Jones with the UCPRC and Marco Estrada with PRS. A detailed agenda of all the topics and presenters is HERE.

Presentations delivered at the conference are available on-line via the CalAPA SlideShare page HERE. A list of attendees registered as of Feb. 19 is HERE.

For more information on CalAPA go to: www.CalAPA.net
PCCAS Meeting Highlights

By Roger Smith, CP2 Center

The Pacific Coast Conference on Asphalt Specifications (PCCAS) met on May 21-22, 2024, at UNR in Reno. The PCCAS is also known as the 'User-Producer' group. Representatives from State DOT’s in California, Nevada, Oregon and Washington, and FHWA Western Federal Lands (WFL) were present along with representatives from the asphalt industry. The CP2 Center is an Associate Member of this Conference.

The PCCAS meeting was led by Shanan Teclamian (U.S. Oil) Producer Chair. She reviewed the new By Laws and the non-profit status of the group and noted that the PCCAS website will be reopened by June 1. (www.pccas.org) Robert Humer, former Asphalt Institute Engineer, has agreed to serve on the Board of PCCAS. Highlights from the Committee Reports and State DOT’s are presented below.

Asphalt Paving Committee  - Chairs are Shauna Teclamian, Nassim Sabahfar (FHWA-WFL).

TASK Group: Test Method for Antistrip Effectiveness

A new research plan and testing matrix for evaluating the Hamburg (HWT) test vs. T-283 test was discussed. It would use 2 aggregates – a known stripper vs. a non-stripper to help determine the best test method. There was extensive discussion about this task – it's scope and its value to the full Pacific Coast area, considering the time and effort involved. It was agreed that cost estimates from 3rd party testing labs – maybe a university - would be sought. Work being done by the AASHTO ‘NTPEP’ program was also discussed, and it was agreed to try to get a speaker on that topic for the next meeting.

Other Business

Mike Anderson of the Asphalt Institute gave a presentation on what might be included in the next version of the PG grading tests & specs – ‘PG Spec 2.0’.

Emulsion Committee - Co-Chair: Andy Clayton (Enviroad)

TASK Group: Use of Paddle Viscometer Evaluation

Andy Clayton (Enviroad) reported on findings regarding the Paddle Viscometers use on emulsions. Viscosity is an important property to ensure the emulsion won't run off the pavement on cross-slopes and grades. The small paddle device has several advantages such as being fast, simple, and requires no cleanup of equipment with solvents. But the accuracy is dependent on temperature of both the device and the emulsion sample, which would have to be controlled if used as a field test. Nevada DOT currently has a test method and spec, and they use this test in the field. Future concerns include the possible need for special tests for 'engineered’ (very modified) emulsions.

Recycling Committee - Chairs Charlie Pan (NDOT) and Shauna T (US Oil)

A presentation was given on the Nevada DOT’s cold in-place recycling (CIR) project on SR-232 near Elko, which involved extensive mix design work and field testing, including the effects of daily temperature variation on milling gradations. NDOT currently fog seals their CIR projects immediately, and caps them with a chip seal within 10 days of placing the CIR. Caltrans will give a report on their pavement recycling program at the next meeting, and it would be valuable to have a DOT ‘round-table’ discussion on pavement recycling programs. A Guide For Partial and Full-Depth Pavement Recycling is available via California’s City-County Pavement Improvement Center (CCPIC) at: https://www.ucprc.ucdavis.edu/ccpic/
DOT / Agency Reports

Each DOT provided an update on current asphalt news from their state. Here are some comments made:

● Caltrans - Christina Barros
  - RAP - Looking at high (40%) RAP allowance (10% in RHMA)
  - BMD – still in very early stages of evaluation
  - EPDs – may require plants to start supplying EPD info with compensation via the FHWA fund
  - CIR - preliminary site investigation is very important

● Nevada DOT - Charlie Pan
  - investigating an OGFC with high resistance to studded tires and chain wear

● Oregon DOT - Chris Duman
  - investigating high adhesion tack coat

● Washington DOT - Sean McGlaughlin
  - budget cuts, so fewer paving projects
  - investigating age-related cracking
  - allowing 40% binder replacement (RAP & RAS); 40% may be too high

● Western Federal Lands (FHWA) – Nassim Sabahfar
  - nothing to report

The next meeting of the PCCAS will be in October 2024 at UNR.
For more information go to: www.pccas.org
Berkeley Tech Transfer / CCPIC Pavement Classes  (various dates)
Thhee classes below are developed in partnership with the City and County Pavement Improvement Center (CCPIC), funded by California Senate Bill 1, the Road Repair and Accountability Act of 2017. This class delivery is supported by the Caltrans Division of Local Assistance, which offers reduced registration fees to employees of California's city, county, regional, and other public agencies. For more information got to:

Home | TechTransfer (berkeley.edu)

Pavement Preservation Construction Inspection (CCI-04)
Self-Paced Online :: Approximately 4 hours
$145 Public Agency Fee, $290 Standard Fee
Instructor: Lance Brown

Construction Inspection of Asphalt-Rubber Pavement Materials (CCI-06)
Self-Paced Online :: Approximately 2.5 hours
$145 Public Agency Fee, $290 Standard Fee
Instructor: Mike Robinson

CalAPA Classes

“Asphalt Pavement 101”  (West Sacramento OR online)
This half-day class is a good review of the basics of asphalt pavement including materials, design, construction and acceptance testing.

Quality Asphalt Paving”  (West Sacramento OR on-line)
This fast-paced session, provides a practical, ‘boots on the ground’ overview for what makes for a high-quality paving operation. It addresses best practices as well as how to identify and avoid problems.

For more information and dates for these CalAPA classes go to:  www.calapa.net

SWCPA Concrete Pavement Workshops  (various dates)
For the full lineup of workshops on concrete pavements go to:  www.swcpa.org
RMWPPP November 12 – 14 (Sacramento)

The Rocky Mountain West Pavement Preservation Partnership (RMWPPP) will hold its annual meeting in Sacramento, November 12-14. The RMWPPP is a regional forum of pavement professionals from State, Regional, Local and Provincial Agencies, Contractors, Suppliers, Academia, Local and Federal Government Officials. State DOT’s - including Caltrans - participate in this group. The Partnership aims to develop sound pavement preservation practices by a beneficial sharing of information on treatment designs, construction practices, performance measures, and research needs. For more information go to:

https://tsp2pavement.pavementpreservation.org/rocky-mountain-west-rmwppp/

NAPA Webinars

The National Asphalt Pavement Association (NAPA) will hold a series of free educational webinars in June focusing on recent data related to Reclaimed Asphalt Pavement (RAP) and Warm Mix Asphalt (WMA) utilization, as well as proper binder selection for airfield work. Details and on-line registration for the webinars can be found at: NAPA Webinars - National Asphalt Pavement Association. For more information go to:

https://www.asphaltpavement.org/programs/napa-webinars
Disclaimer: Caltrans does not endorse any industry products or services, and the contents of newsletter articles reflect the views of the authors and do not necessarily reflect the official views or policies of Caltrans, the CP2 Center, or the State of California.

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