



CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

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Tony Tavares Interview

By DingXin Cheng, CP2 Center

Tony Tavares is the Chief of the Division of Maintenance for the California Department of Transportation (Caltrans) and manages the day-to-day operations of the Pavement Program, Bridge Program, and the statewide Maintenance Program. He is responsible for an annual operating budget of \$2 billion and over 6,000 employees.



Tony Tavares,
Chief, Division
of Maintenance,
Caltrans

Tony has held various executive leadership positions in Caltrans including Chief of the Division of Right of Way and Land Surveys, and District 10 Director. Tony is a California licensed civil engineer graduating from the University of California at Davis and has been with Caltrans for 28 years.



How will the SB 1 funding impact Caltrans Division of Maintenance? What is the funding outlook for both pavement preservation and the State Highway Operation and Protection Program

(SHOPP) program?

Senate Bill 1 (SB 1) is doubling the funding to Caltrans and local agencies. Caltrans accelerates many projects including about \$200 million annually in pavement preservation from SB 1. There are many rehabilitation projects, and about \$1 billion worth of projects that are in design and other various phases each year from SB 1 funds.

Right now in California on the state highway system and the local road system, there is over \$137 billion of backlog maintenance work that has not been able to be completed due to the lack of funding. With SB 1 doubling the existing funding, it will allow us to address the \$137 billion in backlog maintenance over the next 10 years.

Can you discuss the changes that are being

made within Caltrans regarding the PMPC and Rock Products Committees?

There has been a name change from Rock Products Committee to Pavement Materials Partnering Committee (PMPC). The objective of the name change is to emphasize on pavement related products and ensure transparency and more accountability on the team.

The team includes both Caltrans and industry members. The Caltrans hierarchy of team has changed to include **Tony Tavares**, **Steve Takigawa**, **Karla Sutliff** (Caltrans Chief Engineer), and Construction Division Chief is also involved. The purpose of this team is to oversee Caltrans-Industry issues and to provide an escalation ladder for dispute resolution.

There still will be task groups, and subtask groups, but now there is more oversight from the Caltrans executive team on the various subtask and task groups to ensure we reach delivery of our products.

Can you provide an update on Caltrans pavement preservation efforts for both asphalt and concrete pavements?

Caltrans, on concrete pavement, has implemented two pilot projects on thin concrete overlays in Districts 3 and 8. *Continued, next page*

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Caltrans is evaluating and working with the concrete industry on those projects. Asphalt pavement preservation is a large part of what we do at Caltrans, including preserving existing pavement and more cold-in-place recycling projects for pavement. Because of the Federal Moving Ahead for Progress (MAP-21), we are going to use a focused approach on how we use our preservation dollars and our past practice has been doing a thin overlay over a two-mile section.

We may now be looking at localized areas of pavement failure and fixing those localized areas with the preservation money before we can come through with a State Highway Operation and Protection Program (SHOPP) project. The basic strategy is to address localized failures with our Highway Maintenance (HM) program.

What is the status of the Caltrans pavement management system, Pavem? How do you utilize Pavem to maximize the benefits of the Caltrans' investment?

The Federal MAP-21 provided new performance measures. On top of that, Caltrans developed the first Transportation Asset Management Plan, the first one approved in the US and here in California. With those and SB 1, Caltrans now has very specific performance measures. Pavem is able to provide the good, fair, and poor conditions of the pavement, and allows us to identify the poor pavement as targets for improvement in each district. The way we're doing asset management, is that each district is being allocated

a lump sum of funding and being told these are your targets for pavement to address over the 10-year period.

Pavem is helping develop projects that retire so many lane miles of poor pavement, and helping us determine how many of those distressed lane miles we have in each district. Pavem is also helping us provide a baseline to each district on the recommended strategy that should be performed.

With the additional funding from SB 1, we received enough funding that over a 10-year period we will be able to bring 98.5% of pavement within good and fair conditions in California.

There will be many new hires and job transfers for Caltrans, can you tell us if Caltrans is going to provide its employees any training on pavement preservation, rehabilitation, and pavement management?

Absolutely, over the next 10 years Caltrans anticipates 15,000 employees retiring. And SB 1 is doubling the amount of transportation funding in CA, we need to hire more engineers now before we lose those 15,000 employees over the next 10 years and stay ahead of that curve. We plan on providing training through Pavem, developing new design guidelines dealing with pavement smoothness, and providing training on pavement strategies, including both preservation and rehabilitation strategies, to new engineers as they develop projects.

*Many Thanks to **Tony** for his timely input!*



CalAPA Spring Conference

Industry and agency personnel working together to deliver transportation improvements quickly and efficiently was a recurring theme April 24-25 at the California Asphalt Pavement Association (CalAPA) Spring Asphalt Pavement Conference & Equipment Expo in Ontario, California. The group was welcomed by Chairman **Mike Murray** of Vulcan Materials.

Coming on the heels of the passage of California's SB 1, the "Road Repair & Accountability Act of 2017", Conference speakers highlighted the importance of delivering the work to improve roads in a timely manner, while also focusing on innovation, efficiency and safety.

Keynote speaker **Fran Inman**, newly elevated as chairwoman of the California Transportation



By Russell Snyder, CalAPA

Commission (CTC), noted how the CTC helped quantify the rapidly deteriorating state of the state's transportation network, the skyrocketing bill, and now will play a key role in overseeing how the SB 1 money is spent.

"One of our responsibilities ... is accountability and transparency," she said. "We are very proud that we have public hearings, and we offer a place for the public to come and participate."

With SB 1 expected to generate more than \$50 billion over 10 years through a combination of fuel tax increases and vehicle fee hikes, Inman said it is important that the public knows the money will be used as intended and in the most cost-effective manner possible.

Providing a local perspective, **Mary Reyes** with the Los Angeles County Department of Public Works gave an overview of *Continued, next page*

the myriad of projects to improve mobility that are now in the pipeline because of SB 1. These projects will make up a whopping 27% of their road expenditures, and play a major role in helping them reach an average Pavement Condition Index (PCI) goal of 80.

Richard Willis of the National Asphalt Pavement Association (NAPA) provided an overview of national hot topics including warm mix asphalt (WMA - now more than 30% of asphalt mixes), RAP/RAS trends, thinlays (< 1"), thickness design tools (e.g. PaveExpress) and stone mastic



Figure 1. Some Vendor Booths

In addition to vendor booths and equipment displays, the two-day conference featured presentations and breakout sessions on many

asphalt pavement topics, including new research on sustainability, pavement thickness design, asphalt performance, environmental Life Cycle Assessment, practical paving best-practices, asphalt binder and emulsion basics, utilizing data to manage quality and quantifying 'risk' in end-result specifications. New technology, strategies and specifications related to pavement smoothness was also prominently featured.



Figure 2. Outdoor Equipment Displays

CalAPA's Fall Asphalt Pavement Conference & Equipment Expo will be held October 24-25, 2018, at the Doubletree Hotel in Sacramento. For more information go to: www.calapa.net



Highly Modified Micro-surfacing and Slurry Seals

By Toni L. Robinson, Ergon Asphalt & Emulsions, Inc.

Highly modified micro-surfacing and slurry seals provide tougher surfaces than conventional systems, enabling roads to



Figure 1. eFlex ES Slurry Seal Application

better withstand damage that can be caused by high temperatures and heavy equipment, such as school buses, trash trucks, studded tires and snowplows. The increased level of polymer modification in these asphalt-based products provides a tougher, more abrasion-resistant surface sooner after application—thus minimizing a road's window of vulnerability as

the treatments cure and gain strength. An additional benefit of these highly modified treatments for agencies and contractors is that they can be applied using conventional micro-surfacing equipment as seen in Figure 1.

Since being developed, highly modified micro-surfacing and slurry seal binders have undergone strenuous testing including Cantabro (durability) testing as seen in Figure 2 and Stiffness Modulus testing (Figure 3).



Figure 2. Comparison of Performance in Cantabro Abrasion Test with slurry seal on the left compared to micro-surfacing with 3% later in the center and HiMod/eFlex on the right.

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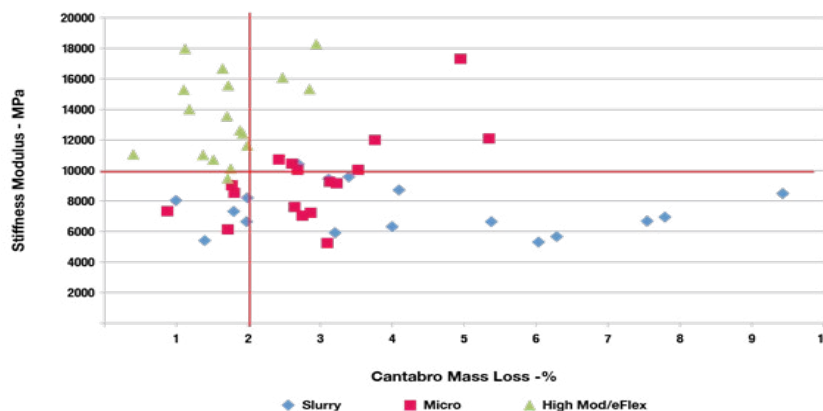


Figure 3. Stiffness Modulus and Cantabro Mass Loss Test Results show the highly modified binder (eFlex) is significantly more durable than standard micro-surfacing systems under extreme damage situations. (Paragon Technical Services, Inc.)

Beyond the lab, they have been proven to perform exceptionally well, maintaining durability and flexibility in various climates across the country - from sunny California, where surface temperatures can rise above 158 °F on a regular basis, to New England territory, where snow and ice storms are prevalent. Ergon Asphalt & Emulsions' versions of these treatments are called eFlex premium micro surfacing (formerly HiMA) and eFlex ES premium slurry surfacing.

Immediate Results

The City of Santa Clara, Utah, conducted a project in which they tested a highly modified slurry seal (HMSS), introduced by Ergon Asphalt & Emulsions, on four roads within their network. Intermountain Slurry Seal was selected as the contractor. The treatment was applied at 14 pounds per square yard with a three-hour return-to-traffic time on each of the roads. Four weeks after application, the roads treated with the HMSS showed no signs of raveling.

Street	Date	As of June 2017	Condition (When Treated)	Mix	Condition (Current)
Beach Road	Sep-13	3 Years, 9 Months	60	Conventional Base, Fiber AC Cap	75
Sanford Street	Sep-14	2 Years, 9 Months	65	eFlex (HiMA)	75
South Pine Creek	May-15	2 Years, 1 Month	70	eFlex (HiMA)	90
Mariners Way	Sep-15	1 Year, 9 Months	50	½" Cape, eFlex (HiMA)	80
Northfield Road	Jun-16	1 Year	70	eFlex (HiMA)	85
Riverside Drive	Jun-16	1 Year	70	eFlex (HiMA)	90

Table 1. Log of PCI Treated Roads at the Time of Application as of June 2017

"I estimate six years with conventional [micro-surfacing], and feel I can get up to 10 years with eFlex," said **Scott Bartlett**, Superintendent of Public Works, Fairfield, Connecticut.

For more information about these treatments, visit: <http://ergonasphalt.com/your-road/highly-modified-slurry-surfacing-systems/>



Long-Term Benefits

The town of Fairfield, Connecticut, needed a solution to withstand the heavy traffic prevalent on roads within their network, including constant snowplowing due to nor'easter ice storms pounding the area in the winter. Historically, they would apply standard micro-surfacing to address these issues, but they needed a tougher solution that could stand up to the heavy traffic and harsh weather conditions that affect their roadways. Pleased with the results from a highly modified micro-surfacing (HMMS) demo, Fairfield decided to conduct another demo on a few roads within their network, this time comparing HMMS to a standard micro-surfacing system.

There was significantly less scuffing on the HMMS-treated roads soon after application, and two years later the pavement condition index (PCI) of these treated roads was much greater than that of the roads treated with the standard micro-surfacing shown in Table 1.

NCHRP Synthesis Report

In the past few years there has been increased interest regarding tack coat specifications, materials, and construction practices. State agencies across the United States are re-evaluating their tack coat specifications, the materials they use, and the practices by which the tack coats are placed.

A new NCHRP Synthesis Report 516 is now

By Roger Smith, CP² Center

available, "Tack Coat Specifications, Materials, and Construction Practices". Information for this synthesis was collected through a literature review and an online survey. Dozens of research papers, agency specifications, and state tack coat guidelines were also reviewed and referenced.

Pavement thickness design *Continued, next page*

assumes that all lifts of a pavement work together as one layer, rather than a stack of individual layers working independently. Tack coats function as boning agents between each lift of a pavement section to create the desired monolithic pavement structure. A tack coat is a sprayed application of asphalt material upon an existing asphalt or Portland cement concrete (PCC) pavement prior to an overlay, or between layers of new asphalt concrete.

If a proper bond is not established between the existing pavement surface and the new asphalt pavement layer, delamination may occur between the layers. Delamination, or separation into constituent layers, may manifest several structural distresses. The primary distress types associated with delamination are slippage cracking and fatigue cracking.

Important considerations addressed by agency specifications are how tack coat is paid for, and whether it is allowed to be diluted. If it is, the specifications can specify who is allowed to dilute it to help avoid accidental over-dilution.

The FHWA/AI Tack Coat Workshop recommended that tack be paid for as its own bid item. It was found that 67% of U.S. agencies and 86% of Canadian agencies pay for tack coat as its own pay item.

The FHWA/AI Tack Coat Workshop also recommended that if tack is allowed to be diluted, that it should only be done by the tack coat supplier at the terminal, i.e., terminally blended. It was found that 46% of U.S. agencies and 57% of Canadian agencies allow their tack coat material to be diluted with water. Over 80% allowed the dilution to be done at the supplier's terminal, but a significant percentage

also allowed the tack to be diluted at the contractor's storage tank (32%) and in the contractor's distributor (48%).

Although asphalt cutbacks, emulsions, and hot binders could all be used as tack coat materials, asphalt emulsions are by far the most commonly used.

A significant variety of proprietary emulsions or additives are available and marketed as non-tracking. However, it is more accurate to call these emulsions "reduced-tracking," because they still require at least some time to set, even though the time is reduced from traditional emulsions. Reduced-tracking tacks are used to improve pavement performance by avoiding the tracking problems associated with traditional tack coats. This material is typically manufactured to harden quickly and adhere minimally to tires. When a lift of hot asphalt is subsequently placed over the tack coat, the hardened tack is reactivated by the heat, and bonds the new overlay with the existing surface.

Based on the synthesis findings, it seems that agencies can improve tack coat performance in several areas:

- How they specify items relating to tack coat
- Proper material selection
- Thoroughly cleaning of the surface before tack coat application
- Selecting the proper tack coat application rate based on existing surface type
- Proper asphalt distributor setup and calibration
- Verifying that the targeted application rates have been applied in the field
- Performing of some type of bond strength test

For more information on this NCHRP Report go to: <http://nap.edu/25122>



City of Los Angeles - A Leader in Street Improvements

By Keith Mozee, City of Los Angeles

The City of Los Angeles' Bureau of Street Services (BSS) is moving forward and making great strides in its repair of streets and its use of innovative technologies. On April 27, 2018, BSS released its 2018 "State of the Streets Report" that found a significant improvement of street conditions in the City. Los Angeles has the larg-



Figure 1. Los Angeles Street Paving After Milling of the Old Pavement

est municipal street network of any city in the United States, and it can now say that it has improved its Pavement Condition Index (PCI) for the first time in decades. The PCI is an internationally accepted method of grading the road surface condition for each city block, with scores from 0 to 100. The 2018 Report *Continued, next page*

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shows an average PCI of the L.A. City street system increase from 62 in 2015, to 68 in 2018, with the goal of reaching 70 or more by 2020.

The following are other key findings that show the Los Angeles street system is getting better:

- As of July, 1 2017, 55% of the road surface areas were in a state of 'good' repair, up 16 percentage points from July 2012. (20% were in fair condition and 25% were in poor condition).
- The condition of residential streets in a state of 'good' repair increased from 42% in 2012, to 58% in 2017.
- The condition of major streets in a state of 'good' repair increased from 34% in 2012, to 50% in 2017.
- Since Mayor Garcetti first took office in July 2013, an historical 11,000 lane miles of pavement preservation and rehabilitation have been completed.
- In 2014, the BBS optimized the small asphalt repair program, and now completes pothole repairs in an average of less than 3 working days.

Nazario Saucedo, BSS Director, indicated that for the last three years, the BSS has been implementing new technologies to optimize resources while protecting the environment. These technologies include:

- Applying cool pavement technology on streets, for the first time in California, to reduce the surface temperature of asphalt roads by approximately 10 degrees Fahrenheit.
- Reactivating the efficient and environmentally friendly cold in-place recycling (CIR) technology for street reconstruction.

- Doing small asphalt repair work driven by GPS systems.
- Building a new state-of-the-art asphalt plant capable of producing new hot mix asphalt that contains 50 percent of recycled material.
- Creating cold asphalt mixes for temporary repairs.
- Developing a new asphalt emulsion called 'Mix 1781', which improves the ride-ability and quality of streets in poor condition until the time that they can be fully reconstructed.

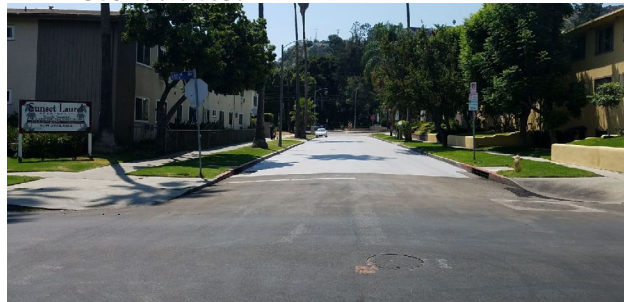


Figure 2. Light-Colored Surface from special sealer to reduce pavement temperature

BSS is using our recent local 'Measure M' and State SB 1 funds to keep setting records for miles paved and making L.A.'s streets safe and dependable for residents. In 2018, the City will break ground on the first street reconstruction project as part of the 'Complete Streets' program, which optimizes critical funding sources to increase pedestrian and vehicular safety, while addressing streets in poor condition. As a result of all the preceding accomplishments, the Bureau continues to be a leader in pavement preservation in the United States.

For more information contact **Keith Mozee** at: keith.mozee@lacity.org



CCPIC Begins Operations

By John Harvey, David Jones (UCPRC, Davis), Dingxin Cheng (CP²C, CSU Chico), Laura Melendy (ITS Tech Transfer, Berkeley), Shadi Saadeh (CSU Long Beach), Ashraf Rahim (Cal Poly SLO)

Local government agencies – cities and counties – bear responsibility for over 80% of the pavement lane-miles in California and carry 45% of the vehicle miles traveled. The condition of California's pavements owned by local agencies has worsened over the past 10 years, as documented in the "California Statewide Local Streets and Roads Needs Assessment" report.

The idea for the City and County Pavement Improvement Center (CCPIC) and initial organizing work began three years ago when cities

and counties were struggling to slow the deterioration of their streets and roads with inadequate funding for pavement. Since then, the passage of SB 1, "The Road Repair and Accountability Act of 2017", will bring much needed funding to local governments for keeping existing good pavements in good condition, and for restoring structural capacity to those in need of rehabilitation. To achieve maximum value from this new infusion of funding, it is important that cities and

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counties have training and access to the most advanced, cost-effective and sustainable pavement practices, science, tools, and resources.

The CCPIC is a partnership of the University of California Pavement Research Center (UCPRC), the Institute of Transportation Studies (ITS) programs at UC Davis and UC Berkeley, the California Pavement Preservation Center (CP²C) at CSU Chico, and the pavement programs at CSU Long Beach and Cal Poly San Luis Obispo. CCPIC has been working with the League of California Cities (League), the California State Association of Counties (CSAC), and the County Engineers Association of California (CEAC) to establish governance and the technical program that CCPIC will deliver. The goal of CCPIC is to fill gaps in the existing programs at its partner universities, industry and government, by providing new programs where needed, and by helping to coordinate existing efforts to meet the needs of local agencies.

A joint committee with members from the League and CSAC will direct and oversee CCPIC, and the program will be delivered under the direction of the consortium partners, led by the UCPRC. The governance structure is currently being finalized by CSAC and the League and will begin operations later in 2018. Funding for start-up and initial operations has come from ITS Davis and ITS Berkeley. The League and CSAC will be working with CCPIC to identify and secure longer term funding to continue and expand to its full potential.

The main activities planned for CCPIC are:

- Provide technology transfer through on-line and in-person training, peer-to-peer exchanges, and dissemination of research results and best practices.
- Develop technical briefs, guidance, sample

specifications, tools, and other technical resources based on the latest scientific findings and tested engineering solutions for local government pavement managers, and the consultants who support them.

- Establish a pavement engineering and management certificate program for working professionals through the ITS-Berkeley Technology Transfer program.
- Serve as a resource center for up-to-date information, regional in-person training, pilot study documentation, and forensic investigations.
- Conduct research and development that produces technical solutions that respond to the pavement needs of both urban and rural local governments.

The work in each of these activity areas will be balanced to address urban, suburban, and rural needs, and the needs in different geographic regions. The types of “pavements” to be addressed in the work of CCPIC includes all types of roads, streets and highways, ranging from gravel and other unsurfaced types of low volume roads to major highways surfaced with asphalt or concrete, and all uses of pavement infrastructure including active transportation, complete streets and permeable pavement.

The CCPIC website has been set-up at www.ucprc.ucdavis.edu/ccpic, and already has initial ‘Best Practices’ Tech Briefs on asphalt compaction, concrete specifications and gravel roads, as well as software tools and other information. Be on the lookout for more information on the website, and initial webinars and in-person training activities planned for fall 2018.

For more information visit the website above or contact **John Harvey** at:

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SB 1 Myths

From Caltransit.org

Senate Bill 1, the “Road Repair and Accountability Act of 2017”, was signed into law on April 28, 2017. This legislative package invests \$54 billion over the next decade to fix roads, freeways and bridges in communities across California and puts more dollars toward transit and safety. These funds will be split equally between state and local investments. With these revenues already rolling in to road agencies, it’s important to dispel some ‘myths’ about the plan.

- MYTH: Practically none of the SB 1 funding will be used to fix our roads.

FACT: SB 1 invests more than \$5 billion annually directly for maintenance, repair and safety improvements of our state highways, local streets, roads and bridges, and mass transit to relieve congestion.

- MYTH: SB 1 funds go into the General Fund with no guarantees the money will be used for transportation improvement projects. FACT: The SB 1 revenues go directly to transportation accounts and are constitutionally protected.
- MYTH: There’s no oversight. FACT: SB 1 creates a new

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office of Inspector General (IG) charged with overseeing the projects to ensure all SB 1 funds are spent as promised.

- MYTH: SB 1 will not relieve congestion or add new lanes.

FACT: SB 1 dedicates hundreds of millions of dollars to transportation improvements that will directly relieve congestion.

- MYTH: California already has the highest gas tax in the nation.

FACT: Pennsylvania is actually the highest. California's gas taxes haven't been raised in more than 20 years leading to a backlog of unfunded infrastructure due to SB 1.

- MYTH: SB 1 funds are being diverted university research.

FACT: Only one-tenth of one percent of SB 1 revenues will be offered to transportation research institutions for research directly related to improving transportation.

- MYTH: SB 1 funds will be diverted to fund high speed rail.

FACT: No funds from SB 1 will be used for high speed rail. The funds will be split 50/50 between state and local maintained transportation infrastructure. There is no remaining balance that could be used for the high speed rail project.

For more information, go to:

<https://caltransit.org/advocacy/key-issues/senate-bill-1/resources/sb-1-myths-vs-facts/>



Every Day Counts Workshops in California A Success

By Jason Dietz, FHWA, and Scott Dmytrow, Telfer Pavement Technologies, LLC. for WRAPP

On May 7th and May 9th, the Western Regional Association for Pavement Preservation (WRAPP) partnered with the Federal Highway Administration to hold two workshops (Los Angeles and Roseville) covering the Every Day Counts 4 Initiative, designed to encourage local agencies and DOT's to use pavement preservation for sustaining infrastructure through "whole life" investments. These day-long sessions were taught by FHWA Pavement and Materials Engineer **Jason M. Dietz**, and WRAPP representatives, **Scott Metcalf** (Ergon), **Scott Dmytrow** (Telfer), and **Jason Lampley** (Intermountain). The instructors guided attendees through the why's, what's and how's of pavement preservation. **Dai Bui** presented L.A. County's pavement preservation program during the workshop in southern California, while **Jerry Dankbar** presented the City of Roseville's preservation program during the workshop in northern California. Nearly 10 different local agencies and Caltrans participated in the two workshops learning valuable strategies on how to best extend the life of their pavements.

Participants began learning how to evaluate the impact of pavement preservation on their Pavement Management Systems and the influence of pavement condition on project selection. Through participatory exercises, attendees worked with workshop leaders and industry representatives on how to identify the root cause of various pavement distresses and which preservation processes would best solve

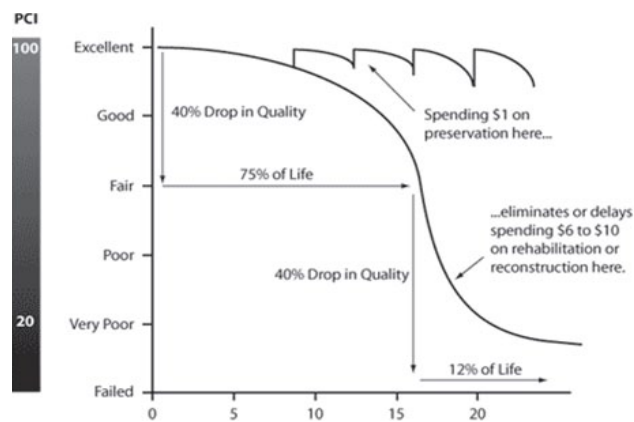


Figure 1. Illustration of the Value of Utilizing Pavement Preservation



Figure 2. Jerry Dankbar from the City of Roseville discusses preservation treatments

specific problems. By determining the most appropriate strategy, attendees could see how employing preservation strategies will extend the life of their roadways thereby saving taxpayers money.

Participants learned how to utilize processes like: Rejuvenation, Surface

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Sealants, Crack Sealing, Micro-Surfacing, Chip Seal, Thin Lift Asphalt Overlays, Ultrathin Friction Course, Hot In-Place Recycling and Cold In-Place Recycling. Learning where each process works best enables agencies to stretch their pavement dollars.

“Good roads cost less” was the slogan for the workshop. The FHWA has long understood that by incentivizing DOT’s and local agencies alike to preserve their assets, instead of relying on a “worst first” strategy, everyone will benefit.

The remainder of the day focused on implementation and gave attendees tips on identifying feasible treatments and strategies for use in their agency. The selection process, when coupled with the knowledge gained on the capabilities of specific treatments earlier in the day, is key when implementing pavement preservation properly. By selecting the most appropriate strategy, agencies will be better suited to target existing distresses - or even proactively treat pavements to extend life.

According to Jason Deitz, FHWA, “ We want to encourage more agencies to use innovation and select the right treatment on the right road at the right time rather than wait until the pavement fails to replace it. That’s one of the goals of the EDC 4 Pavement Preservation program.”

While many of the agencies in attendance like City of Roseville have been utilizing pavement preservation for decades, others are new to the game.

Corinne Allen from Placer County commented

that is was the “...best training I have ever attended”.

WRAPP is looking at possibly including this type of training into their February 2019 conference. Stay tuned for more information or visit: <https://wrapp.org/>

FHWA’s AID Demonstration Facts

The AID Demonstration program provides funding as an incentive to accelerate the use of innovation in highway transportation projects. The Federal Highway Administration (FHWA) expects \$10 million to be made available for AID Demonstration grants in each of fiscal years 2016 through 2020 from amounts authorized within the Technology and Innovation Deployment Program (TIDP) under the *Fixing America’s Surface Transportation (FAST) Act*. The grants are administered through the FHWA Center for Accelerating Innovation.

The AID Demonstration award is based on the cost of the innovation in a project (rather than the total project cost). The award amount may be up to the full cost of the innovation in the project, to a maximum of \$1 million. Funds are available at an 80 percent federal share, which require a minimum 20 percent cost share.

Eligible entities are state departments of transportation (DOT’s), however metropolitan planning organizations and local governments may apply through the state DOT as sub-recipients. For more information or examples and benefits of EDC innovations can be found at: www.fhwa.dot.gov/everydaycounts/.



Reporting Pavement Condition For Local Roads

By Sui Tan, Metropolitan Transportation Commission (MTC), Oakland, CA

Transportation agencies are required to monitor and report the pavement network condition to the Federal Highway Administration (FHWA). For this purpose, the International Roughness Index (IRI), cracking percent, and rutting must be reported for asphalt pavements as stated in the FHWA Highway Performance Monitoring System Field Manual (HPMS). The Departments of Transportation (DOT’s) regularly collect these pavement performance measures for arterial and collector sections in the National Highway System (NHS). FHWA allows local agencies to report the Present Serviceability Rating (PSR), in lieu of the IRI, for sections on roadways where the posted speed limit is less than 40 MPH. But Pavement

Condition Index (PCI) is the most common performance measure used in pavement management systems for local roads. The objective of this MTC study was to analyze if a correlation could be established between the PCI, IRI, and PSR to comply with FHWA reporting requirements.

In a recent study for MTC, IRI and PCI data from 25,229 pavement sections in the San Francisco Bay area in California were gathered for analysis. The majority of the pavement sections corresponds to arterials (94%) with few collectors (4%) and residential (2%) roads. The pavement sections exhibit pavement distresses that should affect the IRI, including distortions, patching, rutting, and alligator cracking at different severity levels.

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

Table 1 shows the number of sections with the various pavement distresses.

Functional Classification	Distortions	Patching	Rutting	Alligator Cracking	Total	Percentage
Arterial	920	3986	965	17803	23674	94%
Collector	22	258	44	722	1046	4%
Residential	3	96	25	385	509	2%
Total	945	4340	1034	18910	25229	100%

Table 1. Summary of Pavement Distress Records

Descriptive statistics, scatter plots, and histograms were generated for the IRI and PCI datasets as a preliminary screening of the data. PCI-IRI regression analysis with all data records did not show any correlation between the two parameters. For further study, PCI data were clustered by individual pavement distress types to conduct separate regression analyses. Attempts to assess the influence of distress severity levels (High, Medium, Low) were also performed by recalculating PCI values. PCIs with only one distress type, and excluding low-severity distresses were obtained for additional analysis.

As a result of the analyses conducted with different combinations of PCI-IRI datasets, it was found that a straight regression analysis could not provide a PCI-IRI equation for practical purposes. A number of factors may influence these results including field conditions and quality control processes during data collection, pavement maintenance surface treatments that improve the PCI but not the IRI, and singular characteristics of the horizontal road profile not related to distresses. Therefore, the PCI and IRI data distributions are different, and consequently there is a need for special analysis to take these differences into consideration.

A hybrid analytical approach that combines statistical techniques with expert judgment was used to complete the study. The PCI-IRI datasets were clustered in quadrants using the IRI boundary limits established by the FHWA to define a pavement in "Good", "Fair", or "Poor" condition, and PCI trigger values used for the same purpose. Table 2 shows the thresholds for the pavement condition levels with PCI and IRI criteria.

Pavement Condition Levels	PCI	Pavement Condition Levels	IRI (in/mi)
Good	100 > PCI ≥ 70	Good	IRI ≤ 95
Fair	70 > PCI ≥ 50	Fair	95 < IRI ≤ 170
Poor	50 < PCI ≤ 25	Poor	IRI > 170
Very Poor	25 < PCI < 0		

Table 2. Pavement Condition Index, PCI and IRI Criteria

A sigmoidal equation was found as the best fit curve for both PCI-IRI and PCI-PSR data.

Analysis of the PCI-IRI data points resulted in Equation 1 where $\alpha = 0.052$, $\beta = 89.1$, and $\rho = 40.157$.

$$IRI = \alpha \left(e^{\left(\frac{\rho}{PCI+400} \right)} \right)^{\beta}$$

Figure 1 shows the PCI-PSR data points that resulted in Equation 2 below where $\alpha = 3.12$, $\beta = 19.15$, and $\rho = 8.82$.

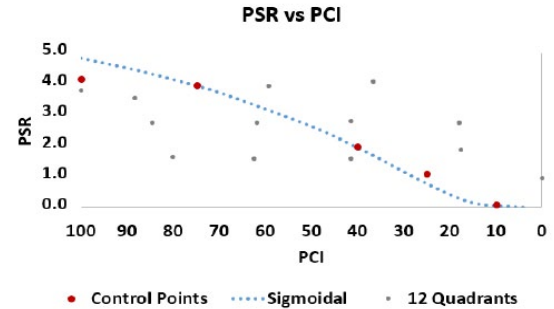


Figure 1. PSR vs. PCI Data Points and Sigmoidal Model

$$PSR = \rho \left(e^{\left(\frac{\alpha}{PCI} \right)} \right)^{-\beta}$$

The PCI-PSR equation developed in this study can be used by local agencies for initial HPMS reports. This equation will facilitate compliance with current FHWA report requirements. The recommended PCI trigger values to define the pavement condition levels for report purposes are shown in Table 3. IRI and PSR thresholds are established by the FHWA for the NHS.

Pavement Condition Levels	Good	Fair	Poor
PCI	PCI ≥ 85	85 > PCI > 40	PCI ≤ 40
IRI (in/mi)	IRI < 95	95 ≤ IRI ≤ 170	IRI > 170
PSR	PSR ≥ 4.0	4.0 > PSR > 2.0	PSR ≤ 2.0

Table 3. PCI - IRI - PSR Pavement Condition Criteria

About the Researchers: **Dr. Carlos M. Chang**, Principal Investigator in this research, is an Associate Professor in the Department of Civil Engineering at the University of Texas at El Paso (UTEP). **Dr. Saurav Kumar** is a Research Assistant Professor and **Luis Valdez** is a Research Assistant at UTEP. **Dr. Roger E. Smith** is a retired Professor at Texas A&M.

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FHWA Update



The White House vs. Congress debate continues with respect to how best to bolster infrastructure investment and the highway trust fund. The White House would like to attract a portion of the massive private capital in the U.S. by encouraging private investment through public private partnerships (P3s). Congress and States aren't so enthusiastic. Seventeen states still don't allow P3s and others (like California) only on a limited basis. The jury is still out on a dozen other proposals, e.g. vehicle miles traveled tax and raising the gas tax. Transportation Secretary **Elaine Chao** is seeking more state and local investment in infrastructure because Uncle Sam currently contributes 14% of infrastructure spending while owning 10% of public infrastructure.

Our newest demonstration project is titled *"Increased Durability of Asphalt Pavements Through Increased In-Place Density"*. Research from the National Center for Asphalt Technology (NCAT) and others support the premise that, in general, a 1% reduction in compacted air voids can extend pavement service life by at least 10%. Ten states, plus the District of Columbia, have received grants to construct test sections. In California, the demonstration project will be on State Route 1 near Pacifica in San Mateo

County. You can read more about the demonstration projects at: <http://eng.auburn.edu/research/centers/ncat/files/technical-reports/rep17-05.pdf>

e-Construction is one of the innovative technologies recommended by FHWA through the Every Day Counts initiative for project sponsors and/or contractors who are willing to try paperless project delivery. e-Construction can expedite projects from advertisement through acceptance and close-out by employing mobile devices and other collaboration tools to capture and exchange construction data, share files and documents and manage resources and workflow. Some of these practices are already mature in California. e-Construction can also save time and money by reducing copying, printing and mailing. A recent technical report entitled

By Steve Healow, FHWA, Sacramento

"Paperless Project Delivery" explains the method. You can read the report at: <https://www.fhwa.dot.gov/construction/econstruction/hif17028.pdf>

If you have an intelligent compaction (IC) project coming up and you could use a review of best practices, consider reviewing the *"ProVAL Smoothness Assurance Module Guide and Training Handbook"* at the Caltrans web page. Also available is a series of twelve online videos, one for each chapter of the handbook. The handbook and videos were prepared by Caltrans and industry experts through a rock products committee task group. The handbook and videos are available at: <http://www.dot.ca.gov/hq/construc/training.htm>

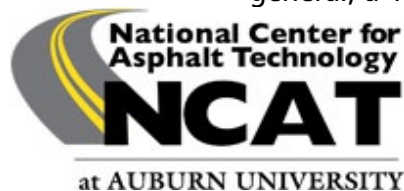
At the same URL you'll find links to 2015 constructions standards training, including a PowerPoint presentation and recorded webcast which explains the logic behind reorganizing the *"Caltrans 2015 Standard Specifications"*, and significant differences since 2010.

New from AASHTO's Transportation Curriculum Coordination Council (TC3) are summaries from many of their on-line short courses for field technicians and trainees. Field considerations and troubleshooting guides include checklists, glossaries and processes for most pavement preservation treatments, including surface seals, thin overlays, microsurfacing, bonded wearing course, patching, edge repair, crack and joint sealing. See the list of TC3 On-The-Job-Aids at: <https://tc3.transportation.org/training-resources/job-aids/>

The "A for Effort" Award for this issue goes to Pima County, Arizona, which has undertaken an ambitious construction-evaluated research project consisting of twelve surface treatments on a 4.3-mile stretch of road. In addition to surface seals and overlays, the 1,000-foot test sections will include base stabilization and roller-compacted concrete. You can read about at: <http://webcms.pima.gov/cms/One.aspx?portalId=169&pageId=425684>

For more information contact **Steve Healow** at: steve.healow@dot.gov

(This will be Steve's last article as he's announced his retirement on June 30. We wish Steve all the best and thank him for his long-standing service to California's transportation system.)





Spotlight on the Pavement Preservation Center at CSU Chico

By Russell Snyder, Executive Director, CalAPA

With protecting California's valuable pavement assets very much in the news these days, an institution dedicated to doing just that showed off its laboratory facilities last week to representatives from industry and agencies.

The California Pavement Preservation Center on the campus of California State University, Chico, was founded in 2006 to be a focal point for research into preserving pavements so that scarce transportation dollars go as far as possible. It is funded by the university, Caltrans and private donors.

Tony Tavares, Caltrans Chief of the Division of Maintenance, and **Tim Gruetert**, Chief of the Caltrans Office of Roadway Materials Testing, were among the attendees Thursday (June 7) to get an update of the center's activities and plans for the future.

Tavares underscored the importance of the collaboration between agency, industry and academia to benefit from the latest knowledge and practical experience with regard to pavement and construction materials, and how research can help inform those discussions. "The goal is to find a resolution, and to keep things moving," he said.

CalAPA members in attendance included **Sallie Houston** with George Reed/VSS, **Scott Metcalf** with Ergon Asphalt & Emulsions and **Scott Dmytrow** with Telfer Pavement Technologies. Metcalf is co-chair of the CP² patrons group, along with **Rene Vercruyssen** with CalAPA member Knife River.

DingXin Cheng, a professor of engineering at Chico State and the director of the CP² Center, briefed the gathering on recent center activities and plans for future research. School of Engineering Dean **Ricardo Jacquez** also addressed the group.

Noting the connection between the classroom and the hands-on activities in the on-campus materials lab, Jacquez said, "When it is a real-world problem they are working on, it is a better learning environment."

The connection between workforce development was also evident for industry and agency representatives who are already actively recruiting the next generation of workers. CalAPA's strategic plan includes a workforce development goal, and the association has sponsored

numerous students, including those from CSU Chico, to attend CalAPA conferences at no charge.

Lab Technician **Brandon Fraser** conducted the laboratory tour portion of the meeting, showcasing the binder testing equipment and various test methods and techniques developed at the center.

For more information on the CP² Center, click [HERE](#) to visit the center's website. CP² research will be highlighted at the CalAPA Fall Asphalt Pavement Conference & Equipment Expo, which is scheduled for Oct. 24-25 in Sacramento. Details on the conference program will be announced in an upcoming issue of Asphalt Insider. For Fall Conference exhibitor or sponsor information, contact **Sophie** you of CalAPA at (916) 791-5044.

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Figure 1. CSU Chico representatives (from left): Kimberly Joslin, research assistant; DingXin Cheng, CSUC Professor, Christopher Jensen, laboratory assistant, and Brandon Fraser, technician.



Figure 2. DingXin Cheng from CSU Chico (left) and student Harry Yu attended the 2016 CalAPA Fall Conference in Sacramento



Figure 3. Brandon Fraser, far right, conducts the tour June 7 of the materials laboratory on the campus of California State University, Chico. DingXin Cheng, director of the CP² Center, is second from the left.



Coming Events: Mark Your Calendar!

"Technologies For Pavement Structural Design"

June 27, 2018

A webinar that will focus on the use of non-destructive testing to characterize in-situ pavement structures, and how this fits into accepted design methods for roadways, highways and airport pavements. For more information go to:

www.roadbridges.com/dynatestwebinar

"Fall Conference and Equipment Expo" **October 24-25, 2018 (Sacramento)**



The California Asphalt Pavement Association (CalAPA) will hold its conference at the DoubleTree Hotel in Sacramento. The Conference will feature speakers from industry, government agencies and academia, as well as vendor displays – both indoor and outdoor. For more information go to:

www.calapa.net

Rocky Mountain West Pavement Preservation Partnership (RMWPPP) Meeting

September 1-13, 2018 (Portland)



The 2018 meeting will include presentations on chip seal and micro-surfacing NCHRP Construction Guidelines, best practices for crack sealing, training/certification programs for pavement preservation, research, outdoor equipment demonstrations and much more. For more information go to:

<https://tsp2pavement.pavementpreservation.org/>

rocky-mountain-west-rmwppp/annual-meetings/2018-2/

By Roger Smith, CP² Center



TECH TRANSFER

"Pavement Maintenance for Local Agencies" **(IDM-04)**

November 6, 2018 (Richmond), December 4, 2018 (Los Angeles)

A popular class taught by pavement consultant, **Roger Smith**, for the Tech Transfer Program at U.C. Berkeley, will be offered in Richmond on November 6 and in Los Angeles on December 4. The 1-day class provides a solid working knowledge of the most common pavement maintenance and preservation practices. Topics include pavement management system concepts, pavement distress types and causes, asphalt materials, maintenance vs. rehabilitation concepts, repair options and common pavement maintenance/preservation strategies. For more information or to enroll, go to:

<https://registration.techtransfer.berkeley.edu/wconnect/CourseStatus.awp?&course=142IDM041203>



CalRecycle Grant Cycle Now Open

CalRecycle announces that its Grant Cycle for FY 2018 is now open for grants for using tire derived aggregate (TDA) in public projects. If you didn't apply for a grant last year and have a TDA eligible project coming up soon there's still time to get free TDA funding! CalRecycle has opened the grant cycle for Fiscal Year 2018/2019. For more information go to:

<http://www.calrecycle.ca.gov/tires/grants/TDA/default.htm>



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. Hector Romero 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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