



CP2 CENTER NEWS

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City of Los Angeles Bureau of Street Services Reaches Historic Street Preservation Milestone of 800 Miles

By Nazario Saucedo, Director, Bureau of Street Services



Nazario Saucedo

On June 30, 2013, the Los Angeles Bureau of Street Services (BSS) completed 800 centerline miles of street work as part of its 2013-2014 Pavement Preservation Program. This is the City's historical high and the work was comprised of 245 miles of resurfacing, 455 miles of slurry sealing and 100 miles of crack sealing. In addition, the BSS performed over 350,000 small asphalt repairs along its 28,000 lane miles of streets.

This accomplishment was the result of the City's renewed commitment to halt the historically consistent decline of the average Pavement Condition Index of the street system and to perpetually preserve streets in good to fair condition while looking for strategies to fund and rehabilitate poor and failed streets.

The confidence demonstrated in the BSS by the City's elected officials is reflected by the financial support that has steadily grown over the past four fiscal years; from 650 miles in 2009-2010, to 747 miles in 2011-2012, and to 800 miles in 2012-2013 (see Figure 1).

Furthermore, newly elected Mayor Eric Garcetti

has publically committed to protect the City's street infrastructure as part of his vision and strategic plan to promote economic development through the improvement and preservation of this valuable infrastructure. The 2013-2014 budget once again funds 800 centerline miles of street preservation work, arguably the highest number by any municipality in the nation and perhaps, in the world. The City of Los Angeles' road [Continued, next page](#)

Miles Completed By Fiscal Year

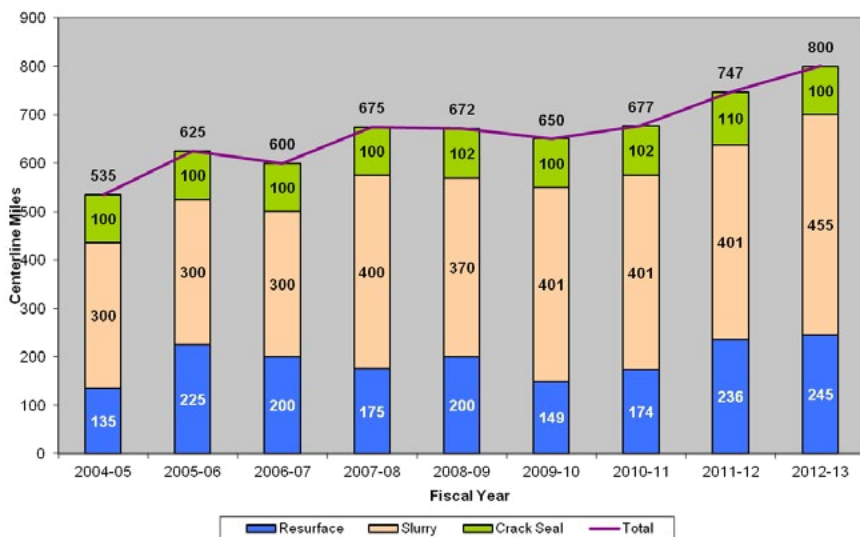


Figure 1. Completed project length by project type and fiscal year

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Figure 2.
Resurfacing
Fulton Avenue

network is comprised of approximately 6,500 centerline miles of streets, which makes L.A. the largest and most congested

municipal street network in the nation. If the pavement area of Los Angeles were laid flat, it would create an equivalent four-lane highway between Los Angeles and Paris, France!

By using a MicroPAVER database since 1998, the BSS performs life cycle analysis on each one of its almost 70,000 street segments to select and schedule the appropriate pavement treatment at the optimal time. This system enables the BSS to cost-effectively comprise its resurfacing, slurry sealing, and crack sealing program.

To maintain the current street network average PCI of 62, the BSS has determined through a comprehensive MicroPAVER analysis that approximately 735 centerline miles of street work are needed annually.

In order to provide a high level of transparency and accountability to the public, the Bureau has published the "State of the Streets" in 2005, 2008 and 2011. This highly expected triennial report explains with a high degree of detail all of the aspects of the City's street network; from condition, to current efforts, pavement preservation strategies, and financial needs. In addition, the BSS also publishes neighborhood council street condition maps with each segment color coded as green, yellow or red (good, fair and failed, respectively). These maps are available for download at bss.lacity.org/NeighborhoodCouncil.htm. Moreover, to utilize the power of social media, the Bureau shares a weekly list of completed resurfacing segments via twitter, Facebook, and the "LA Street Talk" photo blog available at lastreettalk.tumblr.com.

The Bureau maintains one of the largest municipal resurfacing operations in the country through the management of two city-owned asphalt plants that employ ten roving crews of city workers milling and paving five days a

week, with additional projects on weekends and at night as required. All of the asphalt removed from the road surface as part of the preparation for paving is recycled and the city-produced asphalt has a recycled content of up to 20%. To satisfy the resurfacing program's enormous need for hot mix asphalt, the Bureau also purchases asphalt from two contract vendors who provide mixes with a recycled content of up to 50%. Through a public-private partnership, the BSS applies rubberized slurry seal to its streets while simultaneously protecting the environment. Since the adoption of this rubberized surface treatment, the Bureau has recycled over 1 million waste tires. While the current City efforts are historical, the reality is that street repair in Los Angeles was under-funded from the 1950s to the 1990s, allowing many streets to deteriorate to a poor or failed condition. The Bureau's current efforts are focused on maintaining streets in A, B or C letter grade conditions and a small portion of the annual funding is utilized to rehabilitate poor and failed streets (D and F letter grades).



Figure 3. Resurfacing Hollywood at Dolby Theatre

In January 2013, two Los Angeles City Council Members, Mitchell Englander and Joe Buscaino, introduced a motion to propose a \$3 billion general obligation bond to finance the reconstruction of all failed streets in the city. The Public Works Committee of the City Council held a series of community meetings throughout the City to explain the proposal and to hear concerns and/or ideas from residents and stakeholders. The proposal will soon go to full Council where it will be decided whether or not it will be presented to the voters in 2014.

The Bureau has many new and exciting future projects in the works. Under the leadership of Mayor Garcetti, the BSS is

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developing a Great Streets program to promote economic development by revitalizing the streetscape along transit corridors and walkable retail strips. To combat the massive pavement damage from large articulated transit buses, the Bureau has been testing strengthened asphalt binders to increase pavement resistance. Numerous locations along the curb lanes of Wilshire Boulevard were reconstructed using these binders and to date, laboratory analysis has demonstrated a rut resistance higher than that of normal Super-Pave mixes.

The Bureau is also in the environmental clearance stage of an ambitious plan to renovate

City Asphalt Plant I with new equipment that will double production capacity and increase recycled content to 50%. Moreover, the BSS is also exploring the use of proven lighter-colored pavement coatings ("Cool Pavements") that could serve as a climate change adaptation by reducing the heat island effect in urban environments.

There are no certainties in the future, only opportunities. Through strong leadership, unequal commitment, and undivided dedication to the Bureau's mission, every employee of the BSS works extremely hard to prepare for the future while delivering every day quality street services in a timely and efficient manner.



Pavement Preservation: The Time is Now

By Delmar Salomon, Pavement Preservation Systems LLC

The US infrastructure equals roughly 13% of its GDP. This is no small investment, and therefore it needs to be preserved and made to perform at low cost.

The pavement preservation awareness movement began a little more than two decades ago. Today, 'worst first' philosophy is fading, thus giving way for us to revisit pavement management systems that integrate robust pavement preservation components as shown in Figure 1. The preservation of our assets is imperative.

The funding and authorization transportation bill, Moving Ahead for Progress in the 21st

Century Act, known as MAP-21, was signed into law on July 6, 2012. This \$105 billion bill includes performance measures that encompass seven national goals; one of them being infrastructure condition. For the first time, the word 'preservation' appears in transportation legislation, and this represents a major win for the pavement preservation industry. This would not have been possible without strong leadership from private and public partnerships. The first Pavement Preservation Problem Statements workshop was held in Sacramento, California in 2001. The FHWA Pavement Preservation Expert Task Group

was formed later and culminated with the Transportation System Preservation Research Roadmap. Over the years, the leading advocacy organization has been the non-profit association, the Foundation for Pavement Preservation, now known as FP² Inc.

Today, there are four Pavement Preservation Partnerships, Pavement Preservation & Recycling Alliance, as well as, many other supporting groups focused on the theme of preservation.

There have been some major milestones during this twenty-year advocacy for pavement preservation. This is the 10th year since the establishment of the National Center

for Pavement Preservation (NCPPI). Some other organized efforts are the Pavement Preservation Journal and at least two pavement preservation centers; the California Pavement Preservation Center (CP²) with a focus on research and innovation, and the Texas Pavement Preservation Center with a focus on training.

The ongoing deterioration of the highway network, coupled with a decrease of monetary resources makes the implementation of a robust pavement preservation program a big challenge. Agencies will also need to reorganize that in order to facilitate

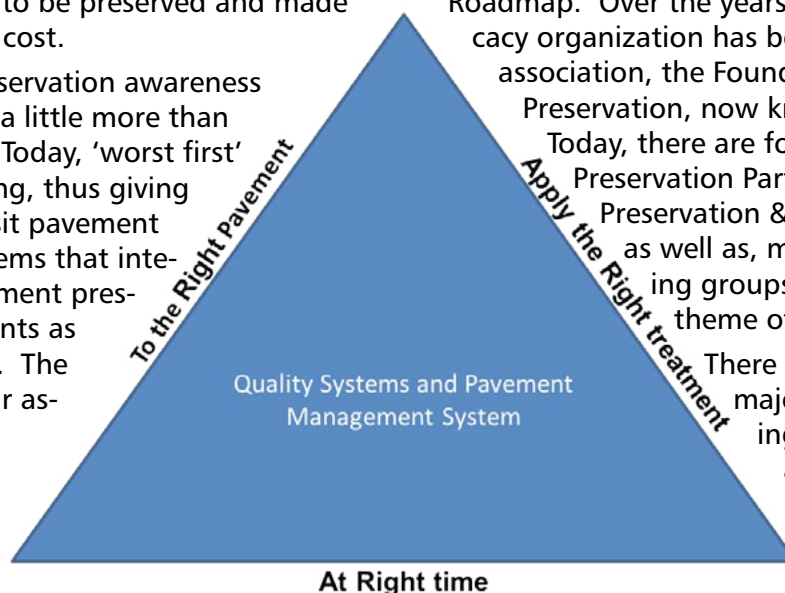
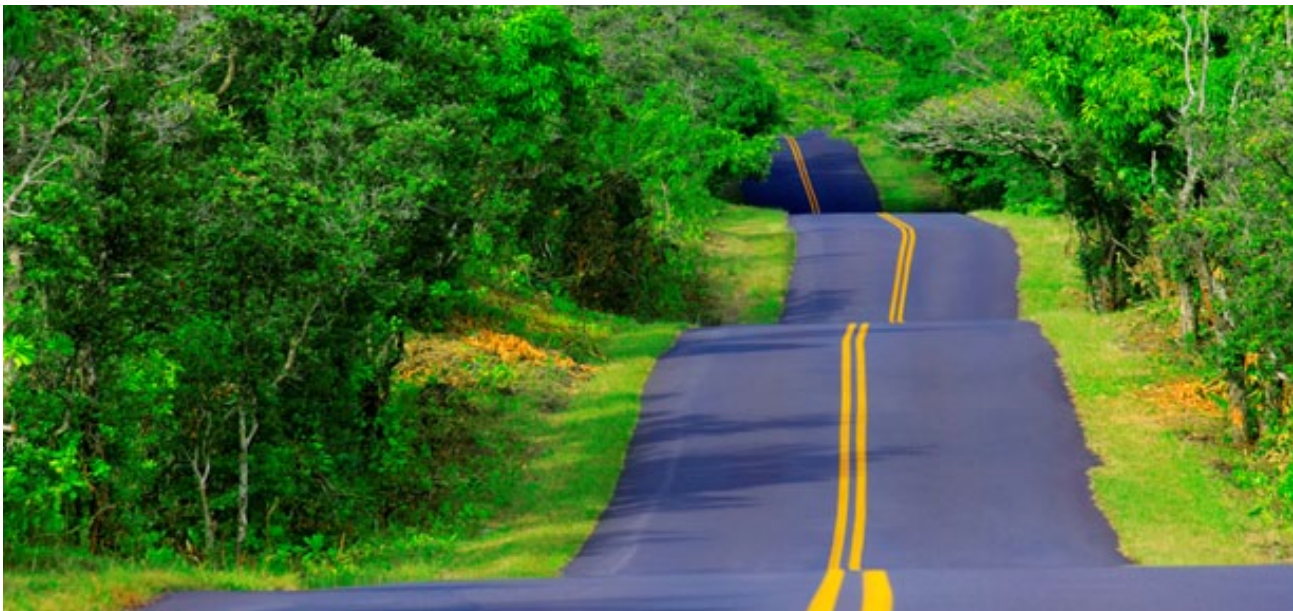


Figure 1. The Pavement Preservation Concept

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Figure 2.
The Road
Ahead



effective communication across their organizations. Pavement management systems must be redefined and also need to include in their modeling pavement preservation performance input, in addition to becoming more network focused. We must be able to demonstrate to the decision makers that we have to protect our infrastructure investments and “kicking the can” down the road for future generations is not going to work.

Ultimately, pavement durability does not only depend on good materials and best construction practices; it also depends on pavement monitoring technologies, strategic decisions, and the appropriate timing of pavement preservation treatment applications – all critical elements. The new legislation, Moving Ahead for Progress in the 21st Century (MAP-21), should facilitate the revision of current pavement management system practices with incentives to implement a robust integration of

pavement preservation into a pavement management system. What then are the challenges for the next decade, aside of decreasing highway funds?

- There is no lack of road data collection, as we have the yearly state report of Highway Performance Monitoring Systems (HPMS) and most agencies have a pavement management system.
- There is no lack of technologies for treating structurally sound pavements.

Therefore, the major challenges are organizational and managerial. We need pavement preservation champions and with top management support. We definitely have a sobering job before us, if the US is to maintain a leadership role in infrastructure preservation and innovative edge in pavement management. The road ahead needs work.



Caltrans Constructs Modified Binder Chip Seal Test Sections on SR 36 in District 2

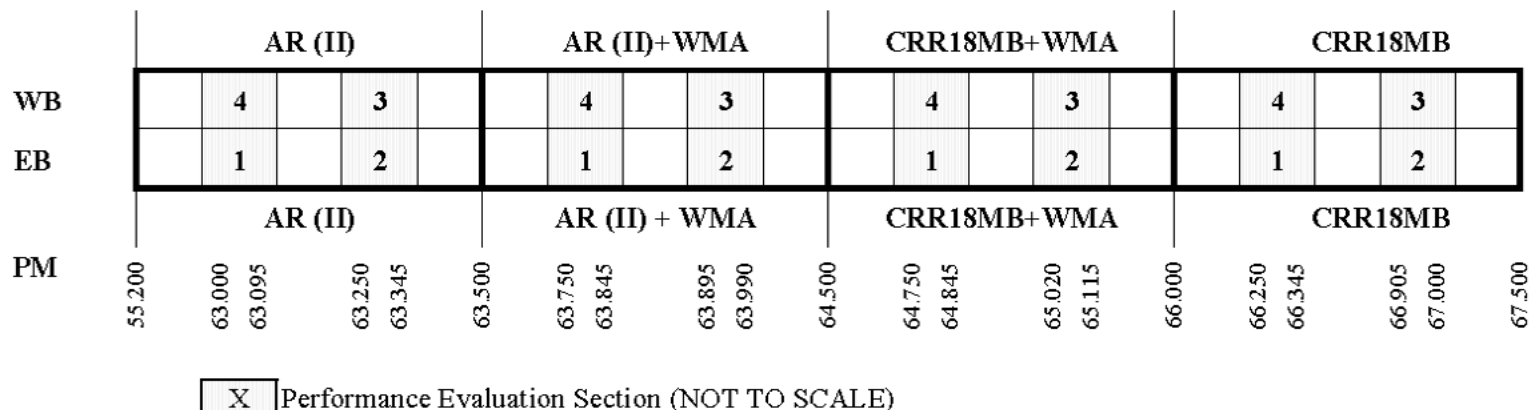
By Peter Vacura, Haiping Zhou and Lance Brown, Caltrans and Ding Cheng, CP² Center

Caltrans has been using asphalt rubber seal coats as a pavement preservation strategy or an interlayer for pavement rehabilitation projects since the 1970s. In California, the asphalt rubber binder used in seal coats has typically been a field blended asphalt rubber binder (Type II) which consists of asphalt binder, asphalt modifier, and crumb rubber modifier (scrap tire crumb rubber and high natural crumb rubber).

In recent years, terminal blended rubberized

binders incorporating a minimum 18% crumb rubber have emerged into the paving industry. These products, including crumb rubber R18 modified binder (CRR18MB), can contain a minimum of 18% crumb rubber and be blended at a refinery terminal. Trials of these products have been mainly conducted in hot mix asphalt (HMA) so far, but local agencies have used them in chip seals. To explore the potential use in seal coats and expand the toolbox of the pavement preservation

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AR (II) = Asphalt rubber Type II

AR (II)+WMA = Asphalt rubber Type II with WMA additives

CRR18MB = Crumb rubber R18 modified binder

CRR18MB+WMA = Crumb rubber R18 modified binder with WMA additives

Figure 1.
Layout of the
SR 36 Modified
Chip Seal Test
Sections

strategy, Caltrans has taken an initiative in looking into the performance of these products.

Caltrans also looked into strategy that could potentially reduce field application temperature by using warm mix technology under the condition that seal coats with warm mix additive will have similar field performance as those without it.

From September 3rd to September 7th, 2013, Caltrans District 2 constructed a pilot rubberized seal coat project to test these products, including:

- Asphalt rubber binder (Type II) with and without WMA additives
- Crumb rubber R18 modified binder with and without WMA additives

The Caltrans Resident Engineer for the project was Tony Granados and the general contractor of the pilot project was Sierra Nevada Construction, Inc. The CRR18MB was provided by Paramount Petroleum while the AR Type II was produced by American Pavement Systems, Inc. Western Oil and Spreading applied the CRR18MB and American Pavement System applied AR Type II and the hot coated chips.

Test Section Layout

This pilot project constructed includes multiple test sections. Within each test section, four Performance Evaluation Sections (PESs) were established for performance monitoring. Each PES is 500 feet long. The Post Miles of the PESs are shown in Figure 1. The existing condition of each PES section was evaluated by the CP² Center.

Crumb Rubber R18 Modified Binder Test Section

The construction started on the morning of September 3rd, 2013 from the east end of the project with the CRR18MB. Because the CRR18MB is a new material, binder application rates of 0.40 gal/yd², 0.45 gal/yd², and 0.50 gal/yd² were experimented with and a 0.45 gal/yd² spread rate was selected and used for the rest of this test section. The application temperature for the binder is between 350 and 375 °F. Figure 2 shows hot-coated chips are being sprayed to the CRR18MB.

Crumb Rubber R18 Modified Binder with Warm Mix Additive Test Section

Paving of the CRR18MB with Warm Mix additive started on the afternoon of September 3rd and was completed the morning of September 4th.



Figure 2. Lance Brown Observing the CRR18 MB Seal Coat Test Section Operation

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The warm mix additive was Sasobit GTRM 850 produced by Sasol Wax North America. The binder spread rate was 0.45 gal/yd², same as CRR18MB without WMA. The binder application temperatures were close to 350 oF. Figure 3 shows a picture of CRR18MB with WMA being sprayed.



Figure 3. CRR18MB with WMA Binder Application

Asphalt Rubber Type II Binder with Warm Mix Additive Test Section

The AR Type II with WMA was constructed on September 4th right after the completion of the CRR18MB with WMA

section. The same WMA additive Sasobit GTRM 850 was used. The binder spread rate was targeting at 0.60 gal/yd². The binder application temperature was around 340 oF. Figure 4 shows the application of AR Type II with WMA.



Figure 4 Application of AR Type II with WMA with Sniffer to Control Emissions

A sniffer, installed at the end of the distribution truck and intended to reduce amount of smoke, was also used.

Asphalt Rubber Type II Binder Test Section

The AR Type II test section started in the after-

noon of September 4th and was completed on September 7th. Figure 5 shows the typical applications of the AR (II) binder application. The target spread rate was 0.60 gal/yd² and temperature of the binder is about 375 oF.

As part of the pilot project, a modified field Vialit test to evaluate chip retention and a

modified CT 339 to evaluate field binder application rate were also studied. Figure 6 shows Josh Bay of AMEC holding a sample for the Vialit test. Laboratory testing will be conducted by AMEC, CP2 Center, UCPRC, and Caltrans to determine various properties of the binders used on this pilot project.



Figure 5. AR Type II Seal Coat Application

Representatives from Caltrans and industry were on site to observe the placement of each material, including opacity, the appearance and uniformity of each completed product. CP2 Center personnel provided technical support and will continue to support Caltrans in



Figure 6. A field Vialit Test Sample Collected by Josh Bay of AMEC

various phases of the project, including post-construction evaluation and laboratory testing. Caltrans Construction and the CP2 Center will collect all the submittals and test results required in the pilot specification and then develop a detailed construction report.

City of Chico Resurfaces Downtown Couplet Project Using a Preservation Treatment of Microsurfacing

By Gordon Rayner, CPM and Clark Gardner, Franklin Construction

The City of Chico recently remodeled the downtown area by changing the traffic patterns, adding bike lanes, and resurfacing 1st and 2nd streets using a Type II microsurfacing. All the work was done during the night to prevent major traffic congestion and to allow the contractor space to work. The work was finished early in the morning to allow traffic on the roadways.



Figure 1. First St Completed Microsurfacing Project with the CSU Chico as Background

Maintenance (CPM) of Sacramento was responsible for placing the microsurfacing. The materials used for the project were a microsurfacing emulsion from Paramount Petroleum and the black Type II aggregate was from George Reed's Table Mountain Plant. Two microsurfacing paving units were used to mix and place the microsurfacing at night. There were no major construction issues.

Nighttime weather was good for placing the surfacing material; in that it ranged from 80 to 90° F during the time of placement, which meant that the set times were very

Franklin Construction of Chico was the prime contractor and was responsible for most of the work with the exception of the placement of the microsurfacing. California Pavement



Figure 2. On 2nd Street near Chestnut

quick. The traffic plan was to close the streets, block by block throughout the downtown area keeping one lane available for the traveling public. The work was completed prior to the start of the school year at Chico State which prevented students from having to walk through the work zones. Figure 1 thru Figure 3 show some of the finished work. The green bike lane is a product called Streetbond CL coating, a special paint. This work was done by Asphalt Impressions Inc. out of Sacramento.

For a project that could have been a nightmare

and a major interruption to traffic if done during the day, the understanding and cooperation of the City of Chico working in partnership with Franklin Construction and CPM benefited everyone involved as well as the residents of Chico. What better way to experience a resurfacing project then to wake up and find a "new" street!

Let's hope the City continues to expand

the use of preservation treatments. They are a cost effective way of maintaining the City's street network.



Figure 3. First St Completed Microsurfacing Project with the CP² Center as Background

Rubber hits the road in Yuba City-The Rest of the Story

By Gordon Rayner, CPM and Ben Moody, Yuba City, Department of Public Works History

In July 2009 there were two trials done with AROS (Asphalt Rubber Oxidation Shield), a new type of slurry using an Asphalt Rubber Binder composed of 15% rubber from recycled tires. One was placed in Rancho Cordova and the other following in Yuba City, a trial that was reviewed in the Center Newsletter December 2009 edition. California Pavement Maintenance Company (CPM) constructed both trials. CPM had a history of being involved in tire rubber slurry applications since the 1980s and the AROS system was the latest milepost in the development of a system where the tire rubber contributed substantially improved properties to the end mix.

The Rancho Cordova trial was the first application of an AROS modified Microsurfacing. According to the producer, Asphalt Rubber Systems, the base thermoplastic adhesive was prepared in accordance with ASTM D6114-97 for Asphalt Rubber Binder. John Samuelsson with the City offered a frontage road off

Coloma Road to use as a test basis for this first installation. The road was in very rough condition with open potholes 3 inches deep, a heavily exposed surface, a joint line eroded to 2 ½ inches deep in places and hardly any sizeable section that wasn't cracked or broken,

although still in place. Our initial opinion was that the road was beyond patch and repair and beyond a Petromat and overlay. The proper fix would have been to remove and reconstruct the road.

The first trial day was cut short by rain, disappointing many viewers who traveled some distances to see this new product. The second attempt went smoothly with potholes being filled with an AROS micro with added cement

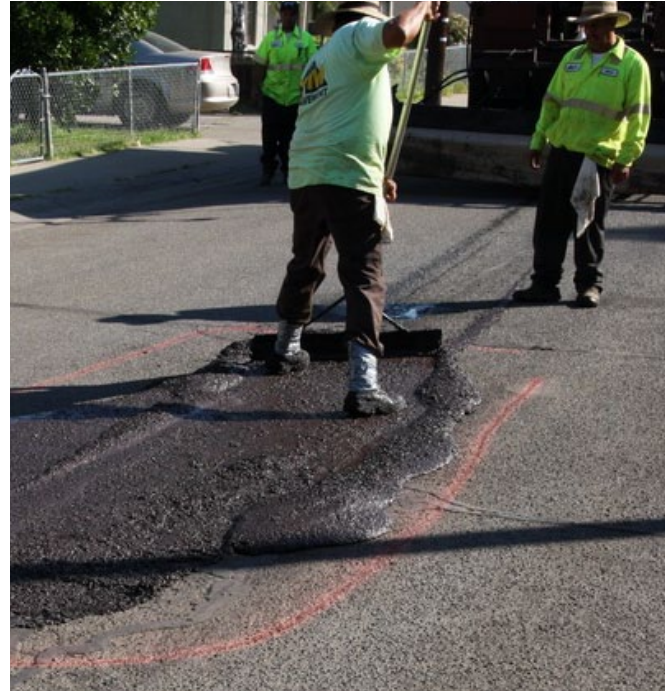


Figure 2. Fixing Potholes in a Frontage Road off of Coloma Road

to assist curing and then a new surface coating covering the rough surface and joint line. The final appearance was smooth and, with the exception of some color variations, appeared to have accomplished a good restoration. Time would tell.

A few weeks later CPM asked the City of Yuba City if they would consider a trial in one of the two upcoming contracts the city had. One contract involved a Polymer Modified Asphalt-Rubber Cape Seal of hot asphalt rubber chip with a Type II Slurry surface coating. Another project (the one CPM won) was to be an annual conventional Type II Slurry Seal contract. As it turned out, the slurry contract was scheduled to begin just as the Cape Seal work was finishing.

Just prior to initiation of the slurry contract, CPM asked if the City would like to do a trial section of AROS explaining that the AROS slurry would use the same Type II aggregate the City had specified for the slurry contract but with a higher application rate of 23 pounds of aggregate per square yard. CPM also suggested performing the trial on the east end of a street that was already covered on the west end by the hot rubber Cape Seal. The street, Woodbridge, was heavily eroded with a

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Figure 1. Crack Sealing of a Frontage Road off of Coloma Road

lot of cracks and a few distressed and/or sunken areas.

Yuba City was new to both processes: hot Asphalt Rubber-Cape Seal and the AROS emulsified Type II Slurry and agreed, feeling it was worth placing the trial and watching the performance of both products. CPM scheduled the AROS work for early morning on July 28th, 2009. City forces had already filled the cracks with a hot rubber material. CPM representatives walked the street and marked out areas which they felt needed additional attention consisting



Figure 3.
Photos of
Woodbridge in
August 2013,
pavement is 4
years old

of some broken areas that had begun to sink and one lateral pipe line that had depressed and caused the surface to break. CPM delivered crumb rubber modified AROS emulsion to the stockpile and the crews made the change from regular CQS emulsion to the AROS emulsion for the trial. The RoadSaver™ slurry units had already been calibrated for the AROS emulsion and these machines were set to produce the desired mix design using 18% emulsion. On arrival at the project site, the first order of work was to pre-treat the cracked and sunken areas selected by CPM. While most of these areas were less than an inch in depth, one was notable as being over 1 ½ inches deep just 3 feet from the curb.

With the desired areas treated, the crew began placing the AROS Slurry with a half spreader box pass down each side of the street. As crews worked, City staff, outside agencies, and CPM representatives gathered next to the area of 1 1/2 inch deep repair to watch the loaded slurry truck drive across it just 40 minutes after placement. Surprising to all, the material was firm and held the estimated 55,000 pound weight of the loaded truck!

The total AROS application was completed in slightly more time than the standard

slurry would take, due mainly to the pre-treating of selected areas and to the change to the heavier application rate. The finished surface was similar to that we would expect from a heavy application of slurry or micro.

The Rest of the Story

The best answer as to how well the product will perform is to allow enough time to pass to expose the roads to all of the weather, traffic, garbage trucks and other factors that they face in everyday service.

In July of 2013, just one week after the 4 year anniversary of the Yuba City trial, both projects were surveyed and the following observations were noted:

1. Coloma Frontage Road, City of Rancho Cordova

- There are no signs of the potholes – you can't even find where they were.
- There is no sign of the highly eroded joint line.
- The surface is smooth and serviceable.
- There are lots of hairline cracks from the distress that was underneath.
- Given the condition the road was in at the time of application, the results are very impressive.

2. Woodbridge Road, Yuba City

- There are hair line cracks where continued settling or base movement is taking place.
- You can't find the broken and crack filled areas that were pretreated other than some thin reflective cracks.
- The large 1 ½ inch deep depression flowing to the water valve that was filled is still filled.
- The large, wide, heavily rubber filled cracks that were everywhere are still there, still visible but they still have AROS on top of much of them.

Viewing the Yuba City AROS treated section in the photos below compared to what the road was before the treatment indicates that the AROS was a very worthwhile investment. The AROS product is available for use in California and for those interested in trying it out, please contact Gordon Rayner at grayner@cpmamerica.com.

Epoxy Asphalt placed on the San Francisco–Oakland Self-Anchored Suspension (SAS) Bay Bridge

By John Bors, ChemCo Systems

The newest suspension bridge in the United States open in September 2013 using Epoxy Asphalt as its long life pavement.

In July 2013, ChemCo Systems supplied Epoxy Asphalt to support the paving of the new East Span of the San Francisco–Oakland Bay Bridge in California. The paving contractor on the job was O.C. Jones from Berkeley, California who had previously placed the epoxy asphalt on the bay bridge. The materials supplier was Hanson Materials, also from Berkeley, California.



Figure 1. Applying Epoxy Asphalt on the new East Span of San Francisco-Oakland Bay Bridge

The Epoxy Asphalt is a “tricky material” to use and requires that the mixing plant be close to the project site. The pavement was placed in cool weather with no major problems in June and July of 2013. Other



Figure 2. Applying Epoxy Asphalt on the new East Span of San Francisco-Oakland Bay Bridge

bridges in California that have used epoxy asphalt include the Golden Gate Bridge, the San Mateo Bridge, and the Coronado Bridge in San Diego.



Figure 3. The East Span of San Francisco-Oakland Bay Bridge superstructure

The \$6.4 billion bridge opened to traffic in early September 2013 and will immediately handle a daily average traffic volume of 280,000 vehicles. The traffic count will establish the new bridge as the busiest in the world (for 10 lanes). The unique Self Anchored Design utilizes a single tower and represents the largest of its type in the world.

The new bridge replaces a 1930s era steel truss bridge (East Span) which is unable to meet current seismic performance requirements. The existing bridge uses an earlier generation of Epoxy Asphalt in a $\frac{3}{4}$ inch overlay that has lasted 37 years and approximately 3 billion vehicle crossings.

The current project features 4900 U.S. tons of Epoxy Asphalt installed on the 180,120 ft² steel deck in two 1 inch thick layers. The paving project took less than 2 weeks to complete and includes 10 lanes and 4 shoulders.

Epoxy Asphalt is specially designed for long span bridges which use orthotropic steel decks to minimize weight. The unique combination of epoxy and asphalt provides a highly durable road surface that handles high traffic loads with a long operating life and outstanding fatigue performance. The new San Francisco Bay Bridge has a design life of 150 years and the epoxy asphalt pavement is projected to last 25 to 40 years, much longer than alternative driving surfaces.

ChemCo Systems manufactures Epoxy Asphalt in California. It is frequently exported for use on long span bridges internationally, especially in China. For more information on epoxy asphalt projects check out the Chemco website at www.chemcosystems.com.





NGCS “Quiet Grind” Technology Receives Transportation Innovation Award for a California Project by John Roberts, IGGA, and Craig Hennings, SWCPA

The new freeway surface treatment, the Next Generation Concrete Surface (NGCS), was tested by Caltrans District 11 as part of a pilot project conducted last year on I-5 in Solana Beach, Calif. Recently, the project was recognized in California’s 2013 Excellence in Transportation Awards. The project was awarded the top Transportation Innovation project in California, as well as the top Innovative Transportation Solution at the Women in Transportation Seminar (WTS) San Diego 2013 Annual Awards.

NGCS, known as “Quiet Grind” in California, was used on a one-mile stretch of I-5 within the North Coast Corridor (NCC) between Via de la Valle and Lomas Santa Fe in Solana Beach. The Quiet Grind surface treatment combines conventional and modern grinding methods to create a smoother and quieter ride. The results showed that the Quiet Grind noticeably reduces freeway noise.

The contractor on the I-5 job was Penhall Construction out of San Diego. The NGCS surface treatment is being considered for larger freeway projects in California, such as the planned

I-5 Express Lanes Project, which is part of the overall NCC Program. Figure 2 shows the finished texture for the NGCS treatment. The NCC Program also includes rail, transit, highway,



Figure 1. Project location in Solana Beach

environmental and coastal access improvements from La Jolla to Oceanside. The improvements will take place over the next few decades.

For more information on the NCC Program, please visit www.KeepSanDiegoMoving.com/NCC.

The 2013 Excellence in Transportation Awards included 80 entries from local and public agencies, private contractors, consultants, and Caltrans. WTS is an international organization dedicated to building the future of transportation through the global advancement of women.

For more information on NGCS, check out the IGGA website at <http://www.igga.net/NGCSFactSheet.pdf>.

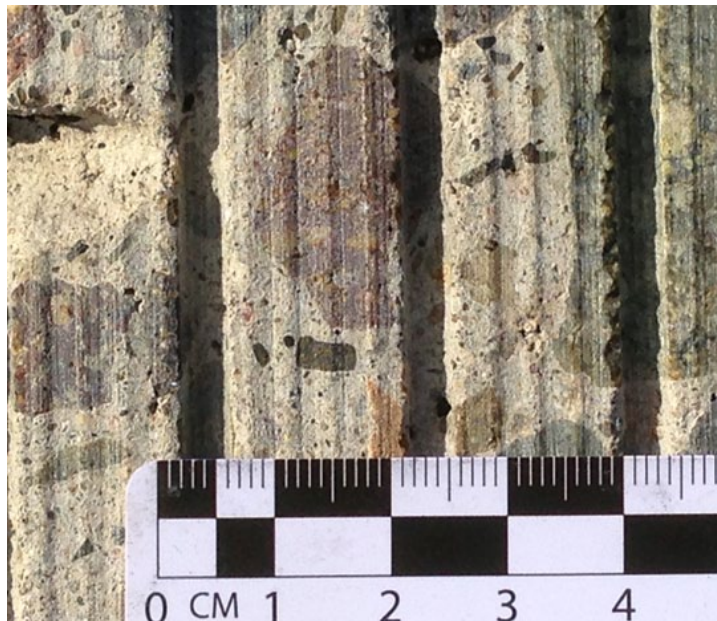


Figure 2. Closeup of finished surface





CP² First International Equipment Training at CSU, Chico-- Aug 2013 By Marianne Rolland, James Cox & Sons, Inc.

With the recent Caltrans move to Superpave, and the desire of James Cox and Sons, Inc. to disseminate the knowledge of their new product range, a training event was held on the 20th and 21st of August, with the CP² Center supported a two day training session presented by James Cox and Sons, Inc. and their agents. Over twenty participants from the US and Canada attended. This very successful event held at the CP² Center's laboratory at Langdon Hall, CSU, Chico. Figure 1 shows the participants in the classroom, and Figure 2 shows a laboratory presentation.



Figure 1. Classroom Environment

Research Technology evolved from the Nottingham University Pavement Research Group, which was led by Professor Steven Brown. Brown and Cooper were instrumental in the development of performance tests in the UK. These tests are now incorporated into the European, ASTM, and AASHTO test standards.

Training started with an introduction by Doug Zuberer (Business Development Manager, Cox) and then moved to hands-on demonstrations by Andrew Cooper (C.E.O., Cox) on the Superpave Gyratory Compactor, Rolling Thin Film Oven and Hamburg Wheel Tracker. These



Figure 2. Lab Presentation by Brad Whiting, with Peter Vacura, Caltrans on far right.

This company has a long history in the development and production of high quality testing equipment for asphalt materials laboratories used throughout the world. In 2012, the British company Cooper

Research Technology acquired James Cox and Sons, Inc. to expand their company's capabilities to the United States. This was an easy transition due to similarities between the two companies. James Cox had strong connections with Francis Hveem and Professor Carl Monismith while equipment was being developed for the Hveem asphalt concrete mix design, and later the James Cox and Sons company developed performance testing equipment for the SHRP mix design. On the other side of the Atlantic in the U.K., Cooper



Figure 3. Cox Hamburg Tester

demonstrations generated many questions and significant insight into the Cox equipment and its testing capabilities. Figure 3 shows the Hamburg tester that

Continued, next page



Figure 4. Four Point Fatigue tester

was presented at the training.

On the second day, there were demonstrations of the Four Point Fatigue tester, shown in Figure 4, which in Round Robin tests, has been shown to be the best device of its type in production. The Rolling Compactor, shown in Figure 5 was also demonstrated, and this equipment is essential in manufacturing samples for the Four Point Fatigue tester. Outside of North America, rolling compaction is preferred over gyratory compaction, although gyratory

compaction is the most common method of asphalt mixture compaction in the laboratory. It has the capabilities to make slabs for both the Four Point Bending Beam and the Hamburg Wheel Tracker. Also on the second day, Brad Whiting (OEM Inc) gave a very interesting presentation on the Thermal Stress Restrained Specimen Test (TSRST) device shown in Figure 6. Brad has been producing these machines since the early 1990s. Recently, there has been new interest in this test, and in



Figure 5. Rolling Compactor



Figure 6. Thermal Stress Restrained Specimen Test

its variations. There is a new provisional AASHTO standard test method and also a new European standard test method. The day concluded with an overview of the many available laboratory equipment items through the Cooper/Cox network. The feedback received

confirms that the two day event was a tremendous success, and that there is a need for more training of this type.

Cox would like to thank Dr. Cheng, Lerosé Lane, and Brandon Fraser, for their hard work on furnishing a cheerful environment to host this successful event.

For additional information on James Cox and Sons' products, visit www.jamescoxandsons.com.



CP² Center Update by Ding Cheng, Director of the CP² Center

The purpose of the CP² Center is to provide pavement preservation services to public agencies and industry, and to integrate the research with the teaching of the Chico State civil engineering students. The following provides news regarding the Center activities.

Caltrans Realcost 2.5 CA Manual and Online Training Updates

CP² Center is working with Caltrans engineers to revise its life cycle cost analysis (LCCA) manual and online training. Caltrans worked with UCPRC to upgrade the Caltrans life cycle cost analysis program Realcost from version 2.2 to version 2.5 CA. The upgrade was completed

in August 2013. CP² Center is supporting Caltrans with the following major tasks:

- reviewing Realcost CA version 2.5
- revising Caltrans LCCA Manual with version 2.5
- developing examples for typical Caltrans LCCA project scenarios
- upgrading the existing Caltrans online training classes on LCCA

So far, we have completed the new 2013 LCCA Procedures Manual. The Center staff is working closely with Caltrans engineers to make the LCCA procedure easier and *Continued, next page*

clearer for Caltrans' engineers.

CalRecycle Rubberized Hot Mix Asphalt Performance Models

Currently, California generates more than 40 million waste tires per year. The Department of Resources Recycling and Recovery (CalRecycle) has a goal to increase the usage of processing waste tires into more value added tire-derived products in California. CalRecycle promotes the use of waste tires in various pavement strategies as part of their ongoing effort to divert waste tires from landfills in California. The long-term performance modeling and development of performance curves of rubberized hot mix asphalt are needed to predict future performance and perform life cycle cost analysis.

The CP² Center is working with Metropolitan Transportation Commission (MTC) and local agencies in the San Francisco Bay area. It is also working with the Los Angeles Basin and Central Valley to develop performance models for local agencies.

The Center staff is also working with Caltrans and UCPRC to model the performance of Caltrans rubberized asphalt pavements.

In the laboratory, we have compacted beam samples using mixes from both northern and southern California. We have run some 4-point beam fatigue tests that are showing the performance differences between rubberized hot mix asphalt and conventional dense graded HMA.

Bay Area MTC Pavement Management Quality Assurance Program

The MTC wants to enhance its quality assurance for the MTC pavement management program. MTC has contracted with the CP² Center to conduct the following major services:

- Task 1. Administer Rater Certification Program
- Task 2. Conduct Audits of Contractor's Quality Control Plan
- Task 3. Verify Data Collected by Contractors

Sui Tan of MTC arranged training for the CP² Center staff during the 2012 Fall User Week of the StreetSaver. Professor Roger Smith of Texas A&M University provided a more detailed training to the Center staff in March 2013 on detailed flexible pavement condition survey. In July, Center staff learned

detailed pavement condition survey on concrete pavement and also helped MTC and Professor Smith set up the test sections for the MTC's Rater's Certification Program.

Butte County Full Depth Reclamation Project

Butte County Department of Public Works is using Full Depth Reclamation (FDR), which is a cost effective and sustainable practice, to rehabilitate a county road, Ord Ferry Road, near the city of Chico. CP² Center assisted Butte County Department of Public Works with a mix design. The existing pavements exhibited alligator cracking, reflective cracking, and longitudinal/transverse cracking, which indicate that the road is good candidate for FDR. FDR is a recycling process which includes pulverizing the existing asphalt concrete surface and granular base, mixing with additives, to form a stronger base material for either an asphalt or concrete surface.

The FDR is a popular technique used by state, county, and city highway agencies that seek a speedy and cost-effective method to improve their roads. Agencies that use the FDR process may save between 20% and 50% over conventional reconstruction methods.



Figure 1. Butte County Constructing FDR with Cement on Ord Ferry Road on September 5, 2013

2013 Bedroll Conference, CEAC

The County Engineers Association of California held its 2013 Bedroll Conference in Lake Almanor, Camp Conery from July 10 to July 12. Ding Cheng gave a presentation on Tire Derived Aggregate and CP² Center Services at the conference. Tire Derived Aggregates (TDA) are shredded waste tires with the sizes ranging from 1 inch to 12 inches. They have many beneficial engineering properties that can be used in various civil engineering applications including retaining wall backfill, embankment fills, slope repair, landfill applications, and vibration damping for light rails.



FHWA Update by Steve Healow, FHWA CA Division

New ADA Policy



Steve Healow

In July, the U.S. Department of Justice (DOJ) and the Department of Transportation (DOT) issued a joint policy memo to clarify the Americans with Disabilities Act (ADA) and associated requirements for installing curb ramps in conjunction with roadway resurfacing projects. The memo was issued in response to queries from state and local jurisdictions. ADA requires new or altered streets and roadways to be accessible to persons with disabilities where pedestrian circulation routes are provided. In this memo, all road work falls under two categories: Alteration or Maintenance. Alterations are defined as resurfacing which extends from one intersection to another and includes overlays of additional material to the road surface. Examples include reconstruction, rehabilitation, open-graded surface course, micro-surfacing, thin lift

overlays, cape seals, and in-place recycling. In those cases, curb ramps are required where pedestrian walkways intersect resurfaced streets. Surface treatments which seal and protect the road surface, improve friction, and control splash and spray are considered maintenance in DOJ-speak and do not require curb ramps. This guidance is available on DOJ's website along with a glossary of terms. For more information, see <http://www.ada.gov/doj-fhwa-ta.pdf>.

Intelligent Compaction

By the time this article is published, Caltrans will have completed the first of six pilot projects using Intelligent Compaction (IC), an equipment-based technology for improving Quality Control and density on subgrade soil, base and asphalt pavement. The first pilot project will include resurfacing on I-80 between Dixon and Vacaville.

IC rollers are equipped with GPS, infra-red temperature sensors, and an interactive data

display for the operator. Onboard hardware and software will collect, analyze, display, store and transfer data. An accelerometer mounted on or in the vibrating drum will measure the stiffness response of the lift under construction and the top 3-5 feet. Based on the stiffness reading the roller may automatically adjust output energy, direction, amplitude and frequency.

IC-equipped rollers don't compute density; rather they measure and exhibit a relative stiffness value or measurement value (ICMV). The ICMV increases as the surface density increases. The operator's display also shows roller coverage via Global Positioning System (GPS), the number of passes, surface temperature and ICMV.

IC is intended to make compactive effort on construction more efficient, i.e. use as much compactive effort as necessary and no more. IC can be expensive. It may account for up to 35% of the cost of a highway grade roller. Field trials are needed for at least two reasons:

- establish a correlation between density and the ICMV; and
- establish what level of accuracy is necessary for Quality Control.

For more information, see <http://www.intelligentcompaction.com/>.



Intelligent Compactor

Remember where you were in 1987?

That's the year Super Bowl XXI was played in the Rose Bowl. Phil Simms and the NY Giants overwhelmed John Elway and the Broncos. That's the year Kareem Abdul-Jabbar, Magic Johnson and the Lakers finished off Larry Bird, Kevin McHale and the Celtics in game 6 of the NBA finals at the Forum. Ronald

Reagan and Mikhail Gorbachev were into their third year of perestroika and glasnost. First class postage was twenty-four cents, gas was \$1.89/gallon, "Walk Like an Egyptian" was the top billboard hit and "The Last Emperor" won Oscars for best picture and

Continued, next page

best director. If you owned an investment portfolio in 1987 you will vividly recall October 22 when the Dow fell 508 points and the U.S. Market lost 22% of its value. 1987 was also a banner year for highway research as congress authorized the Strategic Highway Research Program (SHRP). The purpose of the five-year applied research initiative under the auspices of AASHTO and TRB was to develop strategies to address deteriorating conditions on our highways while improving performance, durability and safety. Scores of new products, materials and strategies in use today were developed under SHRP, e.g, high performance concrete, Superpave, road weather information systems, tests for alkali-silica reactivity, anti-icing strategies, pavement preservation strategies and others. The Long Term Pavement Performance Program (LTPP), which continues tracking the condition and performance

of 2,500 test sections around the U.S. and Canada in a variety of climates, geology, traffic, materials, rehabilitation and maintenance treatments, is a SHRP initiative. Congress has decided to continue this important work as SHRP2 was authorized by Section 52003 "Research and Technology Development and Deployment" of MAP-21. This section directs the Secretary of Transportation to consult with AASHTO and TRB to promote research results and products developed under SHRP2. To that end, over one hundred research projects are underway to address aging infrastructure, congestion and safety. You can read more about SHRP2 products at <http://www.fhwa.dot.gov/goshrp2/> and http://www.trb.org/StrategicHighwayResearchProgram2SHRP2/Pages/Renewal_Projects_303.aspx. at www.fp2.org.



FP² Update by Jim Moulthrop, Executive Director

FP² Inc. continues to be engaged with the Preservation Group experiment at NCAT. Monitoring of Lee County Road 159 continues on schedule with video logging, profile, and roughness measurements conducted weekly and friction, FWD, and subgrade moisture measurements made monthly. Early performance of crack sealing versus no crack sealing on adjacent sections indicate that sealing does mitigate the propagation of cracks. The funding partners, seven state DOTs and FP² Inc. are in the process of developing trigger values as to when and what treatments will be placed on the NCAT track. A partners meeting was held at NCAT in June 2013 and another is scheduled for early December 2013. NCAT conducts its study on the track in three year cycles and we are evaluating the costs of continuing the performance monitoring of Lee Road 159 beyond the three year period. There have been very preliminary discussions of conducting similar studies in other climatic regions but no decisions have been made.

FP² also plan to award the 2013 James B. Sorenson *Excellence in Pavement Preservation* award during the Midwest Pavement Preservation Partnership meeting in November in Indianapolis, IN. Two proposals were submitted to the Awards Committee and the selection will be made at the end of August. You are encouraged to submit a nomination for the 2014 award; details regarding submission can be noted on the FP² Inc. website located

We plan to have a Strategic Planning meeting in late October in Dallas to set the course for FP² Inc. for the next five years. Most of our previous goals have been met and two of the issues for future consideration are the outreach to local cities and counties with the preservation message and how to increase supporters from the preservation industry to FP² Inc. We have made great strides over the past four years and we need to raise the bar as was discussed in the President's Message section of the summer issue of the Pavement Preservation Journal.

An issue facing the preservation industry is the recent joint technical memo from the Civil Rights Division of the US Justice Department and the FHWA legal group related to clarification of maintenance and alterations to the pavement surface in the Americans with Disabilities Act. Without obtaining public comment, in our opinion, the memo delineates treatments into maintenance and alteration categories and requires the installation of curb ramps when alterations to the pavement surface are constructed. The maintenance category, for instance, contains slurry seal and chip seals whereas the alteration category contains microsurfacing. We are working with various groups to determine what course of action, if any, we can take to rectify the categories to represent sound engineering practice.



Northern Counties Road Superintendent Workshop on Crack Sealing by Brian Winter, CP² Center

In June, the Northern California Counties met in Yuba City to learn about crack sealing and to share information and to discuss "what works or doesn't work for us". The workshop was sponsored by Road Works Materials and hosted by Nathan Mayo, assistant superintendent of Butte County Public Works, who was standing in for Steve Stangland, superintendent of Lake County Public Works.



Preparation for Crack Seal Demonstration in the Parking Lot

Over 40 people attended the meeting representing 30 counties and 5 municipalities. Also, Michelle Jolly of Road Works Inc. was present to answer questions about their products. Attendees were treated to a presentation on crack sealing and a Road Works Inc. demonstration using their rubberized crack sealing material.



Larry Blocker discussing best practices for crack sealing

The meeting started with introductions and a power point presented by Larry Blocker, President of Road Works Inc. Mr. Blocker discussed what types of distresses cause cracking in the pavement and when it is appropriate to use crack sealing as a preservation tool. Crack sealing is best used for minor or moderate surface cracking. It is not meant to seal severely affected areas like alligator cracking because excessive use may cause the surface of the pavement to become slippery. In the case of alligator cracking, it is better to only crack seal the perimeter which may help slow the progression of further deterioration. Crack sealing should not be used in situations where there is surface water or hydrostatic pressure causing crack formation.



Crack Seal Demonstration in the Parking Lot using RW 306 CS2 Crack Seal, a product of Road Works Inc.

Mr. Blocker also covered the best application techniques and problems that may arise when applied as part of surface preparation prior to overlay and how to fix or prevent them. Sealant should be applied at a 1:1 ratio which helps keep the sealant from having shrinkage problems when the temperature changes. It is also better to crack seal during cooler weather when the cracks are the widest. One particular issue of interest was bumps forming in a new overlay that has been placed over a newly crack sealed surface. The reason this happens is because the crack seal has a much lower melting point than the hot HMA that is laid over it and it softens upon contact. When the roller passes over the crack sealed

area, the compaction energy forces the crack seal out of the crack and causes a hump to form on the original pavement surface. This hump is then reflected in the new overlaid surface. If this happens, stop paving and roll the direction of the crack.

Mr. Blocker finished by pointing out the importance of balancing your budget to include both funding for maintenance and construction.

Next, a crack sealing demonstration was performed using Caltrans approved crack sealing materials on cracks in the parking lot of the hotel. A flat-headed wand with a cup was used to apply the rubberized crack seal. The workshop was adjourned after a roundhouse discussion about "what works for us" as far as equipment, techniques, and efficiency.

For more information about Road Works Inc visit <http://www.roadworksinc.com/>.



Mark Your Calendar (Coming Events)

California Asphalt Pavement Association (CalAPA) Fall Asphalt Pavement Conference

The conference will be held on Oct. 24, 2013 in Sacramento. It's an one day packed with information. Hear from top policy-makers and respected experts from across the country on topics that will directly impact your business or your agency now and in the future. For more information visit <http://calapa.net/calendar.html>.

6th Rubber Modified Asphalt Conference

This conference will be held on October 15-17, 2013 at Doubletree by Hilton in Tempe, AZ. For additional information, visit

http://www.stref.org/events/rubber_modified_asphalt_conference/index.cfm.

RMWPPP Conference in Anchorage, AK

This conference will be held on October 7-9, 2013. The Rocky Mountain West Pavement Preservation Partnership is a regional forum of pavement professionals working together to promote the benefits of Pavement Preservation through information sharing, education, and application. For more information, visit <http://tsp2pavement.pavementpreservation.org/rocky-mountain-west-rmwppp/>.

Nevada Infrastructure Concrete Conference

One conference will be held on November 5, 2013 in Reno, NV. Another conference will be held on November 7, 2013 in Las Vegas, NV.

MTC StreetSaver Fall 2013 User Conference

The conference will be held on November 6-7, 2013 at Atrium Hotel in Irvine, CA. Topics include pavement distress survey for 20 distresses (ASTM D6433-11), Needs Assessment, QA/QC of pavement distress survey, GIS mapping, StreetSaver overview, introducing MobileRater, and more. For more information, visit <http://www.mtcpms.org/events/>.

AEMA-ARRA -ISSA-PPRA Pavement Preservation Meeting

The meeting will be held on November 11-13, 2013 in Dallas, Texas. PPRA is a partnership of leading industry associations to advance sustainable, Eco-efficient and innovative pavement applications. For more information visit www.aema.org, www.arra.org, or www.slurry.org.

FREE workshops offered by NCAT

Open to "first" one hundred (100) participants.

1. Webinar #1: Intro & Processes (Sept. 17, 2013)
2. Webinar #2: Mix Design (Sept. 18, 2013)
3. Webinar #3: Production and Construction (Sept. 19, 2013)
4. Webinar #4: Performance and Implementation (Sept. 20, 2013)

For more information visit, <http://www.ncat.us/education/implementing-wma-webinars.html>.



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

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.

The Center works closely with the Pavement Preservation Task Group (PPTG), a statewide volunteer group consisting of members from Caltrans, Federal Highway Administration (FHWA), industry, various public agencies and academia to help promote cost-effective pavement preservation.

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