



# CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

No. 25

March 2013

## Caltrans Vision: Working Safer - Smarter - Together

By Tony Tavares, Division of Maintenance Chief



Caltrans wants to be the leader in highway maintenance in the USA. To do this we are practicing the vision of "Safer - Smarter - Together". For example, consider the following:

- Safer = providing the safest transportation system for the public and our employees
- Smarter = being efficient and effective with our limited resources
- Together = collaborating and partnering with all stakeholders and customers

Caltrans has over 6,000 maintenance employees that maintain over 50,000 lane miles of roads and nearly 13,000 bridges and other structures. This does not include the tunnels and tubes, roadside rests, park and ride lots, landscaping, traffic signals, and more. The challenges facing Caltrans are coping with the aging system:

- 80% of the freeway system was built between 1959 and 1974
- 25% of the lane miles are distressed and need rehabilitation
- Culverts are reaching their design life
- Aging areas need to be replaced or updated
- Many of the states bridges are approaching or exceeding their design lives

In addition, competing mandates, including environmental and air quality issues, add additional twists and challenges to doing business in an efficient way. Furthermore, litter and graffiti of our facilities creates public perception problems and costs in excess of \$50 million per year. Other challenges include coping with unknowns such as:

- Earthquakes
- Floods
- Landslides
- Fires
- Theft (including copper wire)

- Explosions causing damage to our facilities

We are facing increased needs as well as declining funding, partly due to loss of buying power. In the past several years we have received one-time funding through the American Recovery and Reinvestment Act (ARRA) and state bonds. This comes to an end this year leaving us with less than \$ 1 billion per year for highway maintenance and rehabilitation, which is down from 2012 where we had

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almost \$2 billion. As a result, we have to be smarter in stretching our limited dollars for pavements. Preservation is one of these important means to use our resources more efficiently. In 2013, we will be shifting funds from other areas into pavement projects. Until we can find other sources of funding to protect and preserve our infrastructure, this approach is the path we will follow. It's also worth noting that in the past 10 years, pavement preservation dollars have tripled to \$234 million.

We are now using asset management techniques to improve managing our facilities. Our pavement management system (PaveM) is now being tested and needs to be integrated with our other management systems including our bridge management system (BMS) and our Integrated Maintenance Management System (IMMS). We hope through the use of these systems we will be making smarter decisions and

focusing more on preservation.

Finally, related to sustainable pavements, expect to see Caltrans continue and/or increase the use of long-life asphalt pavement (LLAP) designs and products such as rubber modified asphalt (RMA), warm mix asphalt (WMA), recycled asphalt pavements (RAP), recycled asphalt shingles (RAS), and in-place pavement recycling.

Training is also a vital component to ensuring our limited resources are efficiently and effectively utilized. Continuing our partnership with the CP<sup>2</sup> Center will assist us in delivering consistent guidance and training to our staff at all levels of the organization.

In summary, we feel it is imperative for us to work "safer, smarter, and together" so we can make use of the limited funds available to maintain our infrastructure. We cannot afford to let it continue to deteriorate.



## CCSA Pavement Preservation Workshop by Roger Smith, CP<sup>2</sup>C

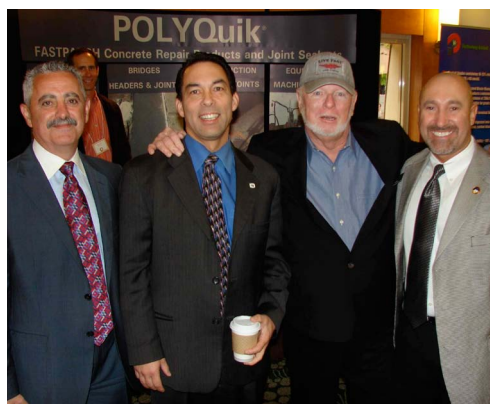
The California Chip Seal Association (CCSA) held their annual "Pavement Preservation Workshop" in San Diego, February 6-7, 2013. Over 260 people from public agencies and industry were treated to informative talks on many of the hot areas of pavement preservation technology. There was also an array of product and equipment vendors displaying their latest items. CCSA members

did a great job of organizing what has become the "go to" event for those in the world of pavement maintenance in California. CCSA's President, Andrew Clayton (Western Emulsions), welcomed the group, and intro-

duced their new 2013 President, Scott Metcalf (Ergon).

### Keynote Speakers

Keynote speakers for the event were Steve Takigawa, Caltrans Deputy Director, and Tony Tavares, Chief of Caltrans Maintenance Division. Mr. Tavares's presentation is highlighted as the



Basem Muallem, Steve Takigawa, John Milner, and Tony Tavares (left to right)

lead article in this newsletter.

Mr. Takigawa overviewed major Caltrans projects recently completed, and cited the need to "streamline" Caltrans internal operations to be able to approve new specifications in less than a

year. He will also be striving to have Caltrans willing to say "yes" more often when it comes to using innovation, and to restore accountability and credibility. He reported that the Caltrans Director has made pavement maintenance of the highway system his top priority, as evidenced by the shifting an extra \$250M into the pavement arena, and even setting aside \$30M specifically for projects involving in-place recycling of pavement.

Other topics and speakers for the Workshop were well chosen to be timely and informative. Here are some highlights from their presentations.

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Scott Metcalf (left), new CCSA President, is welcomed by Andrew Clayton

## *Preparation For Maintenance Surface Treatments*

Roger Smith (CP<sup>2</sup> Center) focused on crack sealing and pre-patching as worthwhile repair activities prior to a surface treatments such as a chip seal or slurry seal. These pre-repairs can greatly improve the overall performance of the surface treatment, and allow us to get by with a surface treatment instead of



**Roger Smith  
(CP<sup>2</sup> Center)  
left and  
Wayne Church  
(Paramount  
Petroleum)**

a more costly HMA overlay. He advised against overuse of crack sealing – e.g. trying to seal alligator cracking or very small, tight (< 1/4 in wide) cracks. For digouts and patching of failing areas, a thickened HMA patch - at least 50% thicker than the original pavement - should be used. In bus and heavy truck areas, he also stressed the importance of using an HMA with high stability, and

performing enough rolling it to achieve good compaction.

### *Fog & Rejuvenating Seals*

John Fox (Caltrans, D-9, Bishop) presented an overview of fog seal work done in their high-Sierra District, where over 1000 lane-miles were fog sealed in 2012. The work included both conventional emulsions and special rejuvenating products. Their findings include the following:

- They usually used PMRE products (e.g., PASS and StyraFlex) diluted 1:1 by the supplier
- They always confirm that the product has the proper dilution
- Some night work has also been done with special formulations
- Use the ring test to zero-in on the proper application rate for that surface texture
- Application rates can vary from 0.08 gal/ yd<sup>2</sup> on old HMA, to 0.12 gal/ yd<sup>2</sup> on an old chip seal, to 0.14 gal/ yd<sup>2</sup> on an old OGFC surface
- Calibrate the spreader truck using a 1000 ft test section
- Striping can usually be applied the same day
- Crack sealing should be done before applying the fog seal

- On rejuvenating seals, apply sand after a few days

They've also tried a "texture seal" using a PMRE fog followed by the application of copper slag sand.

The CP<sup>2</sup> Center has studied and tested the friction characteristics of some of these fog-sealed surfaces. A report should be available after Caltrans approval.

### *Slurry Seal and Microsurfacing Update*

Andrew Bickford (MeadWestvaco) outlined the history of slurry and microsurfacing starting with their use in Germany in the 1930's and continuing on the Autobahn today. He noted the expanded use of polymer modifiers in all slurry seals, but also noted that for rut-filling applications, microsurfacing should be used due to its higher polymer content and cement additive, which allow it to be placed greater than one rock thick and still have stability under heavy wheel loads. He reported that newer generations of slurry and microsurfacing can also involve fiber additives, RAP aggregate and ground tire rubber, and can offer better skid resistance and reduced tire noise.

### *Chip Seal Program in Chula Vista*

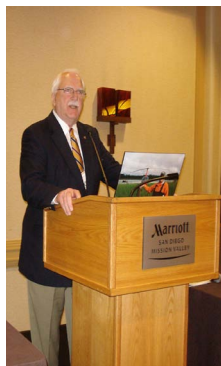
Elizabeth Chopp (City of Chula Vista) presented an overview of their city's successful chip seal program, which has helped maintain their Pavement Condition Index (PCI) at 82 for arterials, and 73 for collector streets. Pavement preservation work uses about 30% of their maintenance budget. They use various binder types for their chip seals, including polymer-modified emulsion, rejuvenator type emulsions, or hot asphalt rubber. Costs for their chip seal work are about \$2.70/ yd<sup>2</sup>, but it depends on the type of binder used. They are also experimenting with using light colored chips for cooler pavements on projects funded by Southern California Edison.

### *Roseville's Surface Treatment Strategies*

Jerry Dankbar (City of Roseville) overviewed that City's pavement preservation program, which involves a variety of surface treatments, including slurry seals, microsurfacing, chip seals (some hot rubber), cape seals, double chip seals, and thin bonded wearing courses. Generally, streets with PCI ratings of 80-100 are candidates for slurry seals, ratings of 50-80 get chip seals, cape seals or thin bonded wearing courses, and if the PCI is below 50, they're

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James Moulthrop (who provided a Federal update)

targeted for major rehab or reconstruction. They have an annual budget of about \$2.5M for in-house maintenance work and \$3M for contracted work. Other treatments the City has tried to include are cape seal over fabric and double chip seals using “warm” asphalt rubber binder.

### *Inspection and Achieving Quality Work*

Doug Ford (Pavement Coatings) outlined what he feels are 3 key elements of an Agency – Contractor “partnering” relationship, as follows:

- Knowledge - assuring that both parties know what constitutes best practices
- Common sense & flexibility - by both parties in resolving field issues
- Observational skills – having the ability to spot problems and potential problem areas as they might develop

Practices that go a long way in avoiding problems include:

- Preconstruction meetings to minimize “surprises”
- Following through on agreements made – sometimes on a handshake
- Open communication – talking often
- Discussing and using check lists
- Agreeing on workmanship expectations
- Agreeing on sampling and testing procedures
- Agreeing on how pay quantities will be measured

### *Quality Control: Friend or Foe?*

Steve Marvin (Labelle-Marvin) spoke on the perception and real value of quality control in construction processes. Posing the question: Quality Control (QC): Friend or Foe?, Marvin proceeded to outline the real value of QC efforts. In addition to documenting contract compliance for purposes of acceptance and contractor pay, QC helps us better understand product performance and relate it to material properties, and helps provide a basis for improving future design standards.

### *Cold In-Place Recycling (CIR)*

Chuck Valentine (Western Pavement Solutions), with over 30 years of experience in asphalt recycling, provided a historic look at CIR efforts and highlighted several newer aspects of recycling technology including:

- Shorter equipment trains that combine the crusher and mixer on one unit
- “Engineered” emulsions
- Improved mix design methods
- The option of a central, off-site cold mixing plant
- More choices for the final surfacing “cap”

He also noted that Caltrans has earmarked \$30M for CIR, so it looks like it’s here to stay.

### *Full-Depth Reclamation (FDR)*

Marco Estrada (Pavement Recycling Systems) noted that FDR has been done up to 18 in deep and is now considered a form of pavement reconstruction that can meet engineering design criteria, and yield savings of 30 to 50% over conventional reconstruction, while requiring almost no haul truck activity and minimizing the loss of access to businesses and homes. FDR can take three primary forms: 1) simple dry grinding (without binder) and compacting to produce an AB layer, 2) grinding the HMA and AB layers and introducing asphalt emulsion, and 3) grinding the HMA and AB and adding chemical stabilization such as cement, fly ash or quicklime. More than 50 agencies in California have used or are now using FDR.

### *Bonded Wearing Course (BWC)*

Scott Dmytrow (Telfer Oil) described BWC as a 2-part surfacing consisting of a heavy spray application of polymer-modified emulsion, followed immediately by paving a thin (< 1 in) layer of OGFC or gap-graded hot mix. Both products are applied by the same special BWC machine. The 2-part surfacing can be placed at a rapid pace – up to 40,000 yd<sup>2</sup> / day - with a quick return to traffic. Prominent jobs that utilized BWC include US-50 over Echo Summit (2002) and on I-80 directly on PCC pavement near Truckee (2012). It was also used on I-8 in San Diego.

### *Rubberized Asphalt Grant Program*

Nate Gauff (CalRecycle) provided an overview of the State’s efforts to use waste tires in asphalt pavements. The department’s grant program, begun in 2005, has been very successful in getting local agencies to use asphalt rubber. Over \$55M has been dispersed to local agencies. CalRecycle has also contracted with engineering firms to provide technical support and training for local agencies using asphalt rubber. The current contract is with Quincy

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Steve Seeds (AppTech) and Haiping Zhou (Caltrans)



Engineering in Sacramento. Current research areas include:

- Using RAP aggregate in rubberized chip seals
- Using warm mix asphalt (WMA) technologies in rubberized mixes
- Development of pavement performance curves for rubberized pavements

An estimated 60 million tires have been recycled in to California pavements in the last 20 years. The current rate of use is about 5 million tires per year. More information on the grant program can be found at [www.calrecycle.ca.gov](http://www.calrecycle.ca.gov).



*Cameron Richardson and Scott Bottomly (Blue Diamond Materials) demonstrate aggregate tests at the CCSA Workshop*

#### *Breakout Sessions Demonstrating Materials Testing*

The Workshop also included three informative breakout sessions where demonstrations of various materials testing methods were provided:

- Aggregate testing - Scott Bottomly (Blue Diamond Materials)
- Asphalt emulsion testing - Steve Escobar (APART)
- Asphalt emulsion base (residual) asphalt Testing - Bob Staugaard (APART)

The practical sessions are always well received by the participants.

#### *Project Awards*

Special CCSA awards for Innovative Projects of the Year went to:

- Town of Los Gatos / Intermountain Slurry (rubberized chip / cape seal)



*Norm Aguirre receiving the CCSA Lifetime Achievement Award. Other recipients include from left to right, Steve Olsen, Jim Towns, Norm, John Milner, Bob McCrea, and Gordon Rayner*

- Los Angeles County / Pavement Coatings / PRS / Western Emulsions (scrub seal cape with RAP)
- Santa Barbara County / VSS (fiber reinforced microsurfacing)
- San Bernardino County / Ergon (remote location chip seal)

#### *Special Award*

One of the highlights was at the end of the day when the CCSA 2013 Lifetime Achievement Award was presented by the Chairman of the Board, Andy Clayton, to Norm Aguirre. Norm, formerly with Reed & Graham in San Jose, spent his 40 year career advancing the cause of pavement preservation and was a most deserving candidate.

Additional information, including the presentations given at the Workshop, can be found on the CCSA website: [www.chipseal.org](http://www.chipseal.org).



## **Folsom Lake Geosynthetic Reinforced Chip Seal**

*By Ray Myers, Asphalt Interlayer Association (AIA)*

Early in 2011, Skip Brown of Asphalt Consulting Services was contacted by Brian Rickards, Project Engineer with the California Department of Boating and Waterways. The Folsom Lake parking lot and boat launch area at Folsom Point, formerly Dyke 8, was in serious need of long overdue maintenance. The asphalt concrete was badly cracked and had not received any preventative maintenance in nearly 20 years.

A new retaining wall was necessary in addition

to some localized hot mix asphalt (HMA) repairs, but primarily a surface treatment was needed to salvage the pavement. Mr. Brown recommended a Geosynthetic Reinforced Chip Seal (GRCS). GRCS is a double chip seal placed directly over Paving Fabric. He designated the asphalt areas needing replacement and also recommended placement of hot-pour polymer modified crack seal on the cracks over 3/8 in width. The HMA, retaining wall, and crack seal

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were accomplished in 2011. However, it was too late in the season to construct the GRCS. That was accomplished in 2012 by Delta Construction Company, Inc. Delta has been perfecting this procedure over the last 30 years.

The GRCS process is comprised of needed surface preparation, which includes removing and



Before  
Application

replacing any pavement sections that deflect under vehicle load. Next, all cracks wider than 3/8 in and deeper than 1/4 in are filled with a polymerized hot-pour crack fill. Rubberized crack fill is not used.

Leveling courses were installed where necessary to improve drainage and ride.

This approach eliminates low spots which hold water over time causing the chip seal to strip. The final result is a “waterproofing” maintenance strategy that lasts for decades.

After the pavement is properly cleaned the Paving Fabric is placed. Full saturation of the fabric by the asphalt binder is absolutely essential. For that reason an application rate of 0.35 gal/yd<sup>2</sup> of PG70-10 hot asphalt binder was used. Insufficient saturation and embedment will result in loss of chips and a failed system. Care was taken in the fabric placement to assure no wrinkles. The fabric is placed with 3 in overlaps longitudinally and butted for transverse joints. Pneumatic rollers set the fabric into the binder to ensure complete saturation. When the ambient temperature began to warm over 80 °F, a light sanding of the in place fabric proved to be necessary to prevent fabric pickup on the chip oil distributor tires. Excess sand was swept off

prior to the application of the PMCRS-2h chip binder.

Fabric was placed the first day, 3/8 in chips were placed the second day and the 5/16 in chips were placed on the third day. The chips were required to meet the State of California Standard Specifications, May 2006. PMCRS-2h binder was shot over the paving fabric at a rate of 0.40 gal/yd<sup>2</sup>. Then medium sized chips meeting 3/8 in were placed at a rate of 22 to 24 lb/yd<sup>2</sup>. Three pneumatic tired rollers compacted the chip seal with a minimum of 5 passes at speeds not to exceed 5 mph. Excess 3/8 in chips were swept up with pickup brooms the following morning. A second application of PMCRS-2h binder was applied at 0.35 gal/yd<sup>2</sup> followed by the application of Medium-Fine 5/16 in chips. Pickup street sweepers were to remove any loose chips used after the chip had set under traffic for one week.

Mr. Rickards said, “This pavement rehabilitation strategy fit our needs and budget, and we are very satisfied with the finished product. We look forward to seeing how it holds up in this use and will consider this at other facilities in the future.”

For additional information please contact Ray Myers of the Asphalt Interlayers Association: [info@aia-us.org](mailto:info@aia-us.org).



After  
Application

## Award Winning Project Uses RAP in Surface Treatments

By Imelda Diaz, Los Angeles County

Los Angeles County is very committed and focused on developing cost effective, innovative, and sustainable solutions to address the repair of our roadways for the motoring public. With the help of suppliers and contractors such as Western Emulsions and Pavement Coatings, we were able to accomplish these objectives for this special project and win a California Chip Seal Association (CCSA) award.

The Escondido Canyon Road, et al., Project actually consisted of preserving 13.4 miles of pavement on three different County roads:

- Escondido Canyon Road from Agua Dulce Road to Syracuse Avenue (first constructed in 1953 with last treatment in 1999)
- Soledad Canyon Road from Antelope Valley Freeway to 2,775 feet east of Mile Marker 14.00 (first constructed in 1936 with last treatment in 1985)
- Syracuse Avenue from Escondido Canyon Road to Crown Valley Road (first constructed in 1935 with last cape seal in 1991)

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The award winning team ...  
**Greg Kelley and Imelda Diaz (LA County), Jim Emerson (Pavement Recycling), and Kevin Donnely (Western Emulsions)**

The goal of the project was to provide a cost effective, sustainable treatment that would extend the pavement service life and improve the rideability of the road. The pavement treatment included: (1) micro-milling the road surface, (2) placing a 5/16 in PASS CR

scrub seal, and (3) applying a micro-surfacing wearing surface. By applying the PASS CR chip retention emulsion as an interlayer, the road's distressed surface was sealed from the elements while rejuvenating the underlying HMA pavement. The micro-milling and the final micro surfacing helped create a smooth, long lasting wear surface.

One of the significant aspects of this project was meeting the County's 2012 goal of utilizing 100% Recycled Asphalt Products (RAP) for all pavement preservation projects located within the northern part of the county. The Escondido Canyon Road, et al., Project utilized RAP for both the scrub seal and the micro-surfacing treatments. It was the first project constructed by the County that met that goal.

One of the other significant components that made this project even more of a success was the innovative use of micro-milling performed prior to the application of the scrub seal. The high differential in temperatures for the region had resulted in numerous transverse thermal

cracks, making the ride very rough. By including the micro-milling process as part of this project the rideability was improved significantly.

The project was completed on time, and by incorporating the use of recycled materials (RAP), the project came in \$80,000 under budget. It's considered a huge success for the County. The contract costs averaged about \$7.00 /yd<sup>2</sup>.

"By utilizing 100% RAP on this project the County was able to preserve the roadway, save taxpayers money,

and reduce green house gas emissions. In addition, Micro-milling the pavement surface



**Application of PASS CR for the scrub seal**

prior to the cape seal significantly improved the rideability of the road. The success of this project has provided a path to greener options in treating our pavements in the future. We are very proud to receive the CCSA award and thank Western Emulsions and Pavement Coatings for their efforts and support," said Greg Kelley, Assistant Deputy Director for L.A. County Department of Public Works.

For more information contact Imelda Diaz at: [IDIAZ@dpw.lacounty.gov](mailto:IDIAZ@dpw.lacounty.gov).



## Porous Pavement Performing Well in Modesto

After 5 years of heavy service, the porous HMA pavement in the parking lot of the new Kaiser Medical Facility in Modesto is doing great. Constructed in 2008, virtually all of the parking stall areas were paved with the porous mix in an effort to minimize runoff from this very large parking lot. This project represents the largest porous asphalt project in California.

The parking lot, utilizing materials supplied by Granite Construction, was constructed with a permeable asphalt paving



**The porous asphalt parking lot at Kaiser in Modesto**

system that will last more than 20 years and acts as a natural filter to break down chemicals and oils that leak from cars. The permeable material absorbs up to 8 in of rainwater per hour without pooling or requiring the need for water to be pumped into storm drains.



## Caltrans Allowing Higher RAP Content

The HMA industry (e.g. CalAPA) has long encouraged the Caltrans to follow most other states and countless municipalities in embracing the sustainable nature of asphalt pavements by utilizing more reclaimed asphalt pavement (RAP) in mixes. The department had previously limited RAP to 15%.

Caltrans recently published a new specification permitting the use of up to 25% RAP in HMA paving mixes. On Feb. 22, the department finally made it official, publishing a Revised Standard Specification (RSS) on its website

with the new RAP standard. However, the higher standard is not without numerous new requirements, including additional sampling, fractionalization, and a reference to the new Hamburg Wheel Track Test. Industry opposed most of the new requirements as unnecessary when RAP utilization is under 30%. With this more permissive specification in place, we can expect more hot mix plants to utilize percentages of RAP higher than the 15% currently allowed by Caltrans.



## Precast Slabs Speed PCC Pavement Repairs

By Debbie Wong, Caltrans District 7 Senior Transportation Engineer, Los Angeles

In Los Angeles, known worldwide for its car culture and high traffic volumes, Caltrans District 7 Maintenance staff needs to repair portland cement concrete (PCC) slabs quickly, cost-effectively and — to the extent possible — permanently. Working together, a Caltrans Maintenance superintendent, two Caltrans senior engineers and a motivated small business contractor are implementing a new solution they've developed to do just that.

The innovative solution they came up with is using precast PCC slabs, which are fabricated in plant-controlled conditions at a precast facility at least one month before being used. The slabs reach full strength prior to being subjected to traffic loads and are stored at maintenance yards adjacent to distressed PCC roadbeds, ready for the next pavement repair. The slabs can be installed at a moment's notice, regardless of weather and temperature, under a service contract similar to repair contracts for concrete barriers and metal beam guard railing.

The slabs and the installation procedures are innovative on a number of levels. For one, the slabs are reusable. Only the dowels, dowel grout, polyethylene sheeting, and the under-slab grout are sacrificed with every re-installation. That means some of the initial cost is recouped when a rehabilitation project follows a repair of this nature.

Another innovation is the Gracie Leveling Lift, a hardware component built into the panel during fabrication. The Gracie Leveling Lift allows crews to lift the panel into the excavation, slide it laterally, if needed for post tensioning operations, and raise it to its finished elevation.

This flexibility reduces the need for grading to exact elevations, surveying, and profile grinding, and translates into a time and cost savings for the State. The

Gracie Leveling Lift is galvanized and made of hardened steel to help ensure it will be fully functional when the panel is reused decades later.

A typical PCC slab panel is 12 ft long, 12 ft - 2 in wide, and 8.5 in thick. The cover over the rebar in the slab is designed so that the slab can be custom cut, up to six in along each longitudinal joint, if necessary. The largest slab has a #6 rebar bottom mat and a #4 rebar top mat, four casted dowel bar slots in each wheel path and nine grout ports. Glass fiber reinforced polymer rebars and dowel bars are substituted for steel in roadway segments containing traffic loop detectors.

Renu Material provides the rapid-setting self leveling grout that is pumped under the precast slab in its final elevation. The grout has been tested for temperatures near freezing to ensure that both the rapid-setting quality and strength are maintained as designed.

Base preparation is a quick process. After the



Using leveling bolts threaded thru the Gracie Leveling Lift hardware, a smooth profile is obtained in minutes

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existing PCC slab and any loose base material is removed from the roadbed, the excavation is checked to ensure the remaining material is firm, stable, and the depth is greater than the thickness of the precast PCC slab. Some removal of the cement-treated base may be required if the depth is inadequate. Adding lean concrete base (rapid-set) may be done if time allows lessening the amount of rapid-setting, flowable grout required to support the precast PCC slab, which, in turn, reduces the repair cost.

Simple installation procedures, inspired by “kiddy pools”, help isolate the repair. Six mil polyethylene sheeting is draped in, up, and over the edges of the excavation — like a kiddy pool — to prevent standing water from reducing the strength of the rapid-setting grout and to inhibit grout migration. This kiddy pool installation procedure has been successfully used in wet con-

ditions and in locations with standing water.

The rapid-strength, flowable, self-leveling grout has been used in air temperatures as low as 41 °F, below the

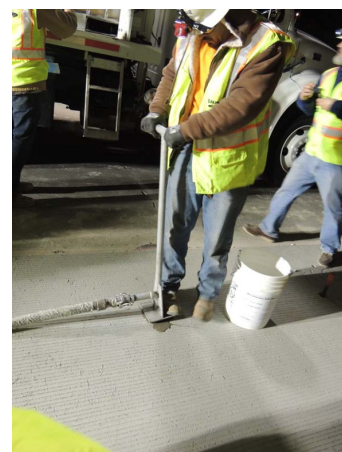
50 °F minimum required by most other repair strategies.

The time required for precast PCC installations is comparable to pour-in-place rapid-strength concrete repairs. The precast PCC installation on northbound Interstate 5 (I-5) at Lake Hughes Parkway took seven hours to place 40 slabs (480 total linear feet of replacements) in four locations in a quarter-mile segment of the truck lane in cold weather (35 °F).

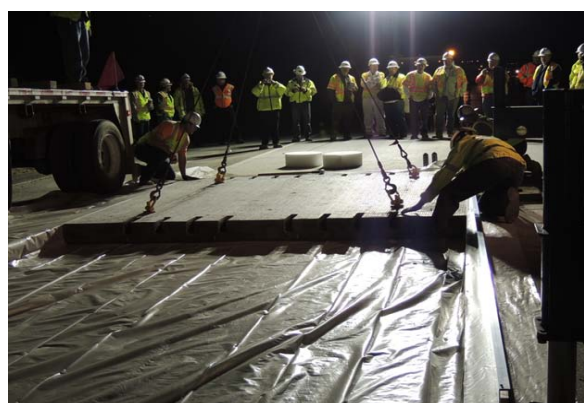
The cost of precast PCC repairs is 20% more than traditional cast-in-place rapid-strength concrete repairs, but as contractors become more familiar with precast installation and pricing becomes more competitive, the cost difference should narrow. Taking into consideration life-cycle costs as well, this precast repair solution for full-depth slab replacement has promise.

As this solution is implemented in more locations, Caltrans staff will continue to look for ways to perfect it. In the meantime, precast PCC installation is proving to be an effective repair strategy that also offers benefits related to safety and agency responsiveness. Because precast PCC pavement repairs are more durable than rapid-set repairs, maintenance closures are minimized, which translates into less exposure of workers to live traffic. Additionally, the ease of access to panels stored nearby and relatively simple installation allow repairs to be completed promptly, reducing motorist complaints and potential damage claims, while providing a safer, smoother, and more enjoyable driving experience.

For more information on this item contact Debbie Wong at: [debbie.wong@dot.ca.gov](mailto:debbie.wong@dot.ca.gov)



**Rapid-setting, self-leveling flowable grout is pumped under the slab**



**6 mil polyethylene sheeting is draped in a “kiddy pool” arrangement to isolate the repair.**



**Dowel bar installation was performed the following shift**



## Update On CP<sup>2</sup> Center Laboratory Accreditation

By Lerosé Lane, Senior Pavement Preservation Engineer, CP<sup>2</sup> Center

The CP<sup>2</sup> Center has recently been working with Caltrans District 2, Independent Assurance (IA) staff, to gain laboratory accreditation and tester certifications. The Caltrans IA Program was formed to meet federal regulation pertaining to quality assurance and independent assurance on highway construction projects. The components of the program

include IA staff certification, tester qualification, laboratory accreditation, annual reporting, and dispute resolution. An overview, the procedures, and the reporting requirements for each program component are described in Section 2 of the Caltrans Independent Assurance Manual.

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**Ding Cheng, Brandon Fraser (performing CT308 bulk specific gravity), and Rene Robinett, District 2's IA person**

There are several reasons for the CP<sup>2</sup> Center's work to be performed by certified testers in an accredited laboratory, all of which are beneficial. The most important reasons are to be confident that our answers with regard to material properties have the proper degree

of accuracy, and that the tests are performed per the California Test Methods. It seems to be unusual for a State university to have this certification since CSU, Chico may be the first. However, with Caltrans contracting with the CP<sup>2</sup> Center to perform research work, and to possibly even act as a third party dispute resolution laboratory, it has become more apparent that laboratory certification is needed for everyone to have confidence that the work is being performed properly. This means that our laboratory is not longer just a "play ground" for our students.

The following changes have been implemented at the CP<sup>2</sup> Center to meet the goals:

- Dr. Ding Cheng has become the Laboratory Manager
- A laboratory book has been created per the IA manual instructions
- A safety manual has been adopted, and safe practices have been adhered to
- Laboratory equipment inventory has been completed
- Equipment maintenance history is being compiled and listed for each piece of equipment
- Our Student Assistants, who work in the laboratory have practiced and passed a battery of CT tests, both written and practical to be certified in Caltrans test methods



**Calibration of CP<sup>2</sup> Center's Dynamic Shear Rheometer in Mar 2013**



**Calibration of UTM Press by Cal-cert**

- Scales have been calibrated
- Presses have been or will be calibrated
- Sieves have been inspected, and worn ones were replaced
- Shakers have been calibrated
- Ovens have been calibrated
- Equipment donations have been made for several essential equipment items
- The CP<sup>2</sup> Center has applied to participate in the Reference Sample Program (RSP) with Caltrans HQ, IA



**Calibration of CP<sup>2</sup> Center's superpave gyratory compactor**

Besides gaining Caltrans accreditation, with the CP<sup>2</sup> Center's laboratory having full asphalt binder testing capability and Superpave mix design capabilities, the Center is planning on moving forward to gain AMRL accreditation with the help of Knife River. This will allow the Student Assistant testers to gain certifications in AASHTO test methods for Hamburg asphalt concrete testing, and various asphalt binder tests. Calibrations were performed by Malvern technology for the Dynamic Shear Rheometer, Cal-cert for the UTM press and the Superpave Gyratory Compactor. The CP<sup>2</sup> Center's Student Assistants will have an advantage by being certified materials testers when looking for jobs after graduation. This will also be an advantage for hiring agencies or industries, since our Student Assistants will already have essential training for and qualifications for both Caltrans and AASHTO test methods.

The CP<sup>2</sup> Center is still looking for additional equipment donations. If your agency or company has good materials testing equipment that is not longer being used, please contact Ding Cheng, e-mail at [dx-cheng@csuchico.edu](mailto:dx-cheng@csuchico.edu) , or at 530-898-6032.



## CP<sup>2</sup> Center Update by Ding Cheng, Director of the CP<sup>2</sup> Center

The purpose of the CP<sup>2</sup> 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 are some news regarding to the Center.

### *CP<sup>2</sup> Center Open House and Patrons Meeting*

The CP<sup>2</sup> Center will host an open house and patrons meeting on March 18, 2013 in the California State University, Chico. There will be about 50 people from Caltrans, FHWA, CalRecycle, Counties and industry participating in this event. The CP<sup>2</sup> Center is hoping to improve and expand its services to California and beyond by developing better partnerships and communication.

### *Caltrans Realcost 2.5 CA Manual and Online Training Updates*

CP<sup>2</sup> Center is working with Caltrans engineers to revise its life cycle cost analysis (LCCA) manual and online training. Caltrans is working with UCPRC to upgrade the Caltrans life cycle cost analysis program Realcost from version 2.2 to version 2.5 CA. The upgrade is almost complete. CP<sup>2</sup> Center is supporting Caltrans with the following major tasks including (a) reviewing Realcost 2.5CA beta version; (b) revising Caltrans LCCA Manual with version 2.5; (c) developing examples for typical Caltrans LCCA project scenarios; (d) upgrading the existing Caltrans online training classes on LCCA. The Center staff will work closely with Caltrans engineers to make the LCCA procedure easier and clearer for Caltrans' engineers.

### *CalRecycle Rubberized Hot Mix Asphalt Performance Models*

Currently, California generated more than 40 million reuse or waste tires per year. The Department of Resources Recycling and Recovery (CalRecycle) has a goal to increase the usage of processing CA 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 efforts 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.

CP<sup>2</sup> Center is working with Metropolitan Transportation Commission (MTC) and local agencies in San Francisco Bay area. It will continue to work with the areas such as Los Angeles Basin, and Central valley to develop performance models for local agencies.

The Center staff is also working with Caltrans and UCPRC to obtain data for use in developing performance models for Caltrans rubberized asphalt pavements.

### *Bay Area MTC Pavement Management Quality Assurance Program*

MTC of bay area transportation planning agency wants to enhance its quality assurance for the MTC pavement management program.

MTC has contracted with the CP<sup>2</sup> Center to conduct the following major services:

Task 1. Administer Inspector 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 CP<sup>2</sup> Center staff during the 2012 Fall User Week of the StreetSaver program. Professor Roger Smith of Texas A&M University will provide a more detailed training to CP<sup>2</sup> Center staff in the last week of March 2013.

### *Butte County Full Depth Reclamation Mix Design*

Butte County Department of Public Works plans to use Full Depth Reclamation (FDR), which is a cost effective and sustainable practice, to rehabilitate two county roads, Ord Ferry Road and Hagen Lane near the city of Chico. CP<sup>2</sup> Center is assisting Butte County Department of Public Works with a mix design. The existing pavements exhibit alligator cracking, reflective cracking, and longitudinal/transverse cracking, which indicate that these roads are good candidates for FDR. FDR is a recycling process which includes pulverizing the



Sui Tan of MTC

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existing asphalt concrete surface and granular base, and mixing it with additives, to form a stronger base material for either an asphalt or concrete surface.

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.



## 92nd Transportation Research Board (TRB) Meeting Held in Washington DC by Ding Cheng, CP<sup>2</sup> Center

The 92nd Transportation Research Board (TRB) annual meeting was held in Washington D.C., January 13 - 17, 2013, attracting nearly 12,000 transportation professionals from around the world. The TRB Annual Meeting program covered all transportation modes, with more than 4,000 presentations in nearly 750 sessions and workshops addressing topics of interest to all attendees - policy makers, administrators, practitioners, researchers, and representatives of government, industry, and academic institutions. More than 40 sessions and workshops addressed the spotlight theme for 2013: Deploying Transportation Research - **Doing Things Smarter, Better, and Faster**.

It was an excellent opportunity to promote

pavement preservation concepts, as well as the CP<sup>2</sup> Center. Dr. Ding Cheng, Center Director, attended the conference and presented a paper titled "Development of an Enhanced Alaska Pavement Preservation Program and Strategy Selection Guide". The co-authors of the paper

include Angela Parsons from Alaska DOT&PF, Gary Hicks of the Center, Hannele Zubeck of UAA, Jenny Liu and Tony Mullins of UAF.

He also attended meetings of the AHD18 - Pavement Preservation Committee meeting.

Roger E. Smith of Texas A&M University, the chair of the AHD18 Pavement Preservation Committee, appointed Ding Cheng as the chair of the Activity Subcommittee of the AHD18



Roger E. Smith (Texas A&M.), Steve Mueller (FHWA), and Ding Cheng at the 92nd TRB meeting

Pavement Preservation Committee. Ding Cheng also attended the TRB workshop, State of the Practice in Ground Tire Rubber-Modified Asphalt, which covers the topics including:

- Why Ground Tire Rubber?
- Performance Grading of Recycled Tire Rubber-Modified Binder Testing
- Alternate Testing Procedures of Recycled Tire Rubber-Modified Binders
- Construction and Recycling of Recycled Tire Rubber Mixes
- Asphalt Rubber Design and Production Procedures
- Terminal Blend Production of Recycled Tire Rubber-Modified Binder
- Recycled Tire Rubber Mixture Performance

The 92nd TRB Compendium of Papers is available online at: <http://amonline.trb.org>



Angela Parsons (Alaska DOT&PF) and Ding Cheng at the 2013 TRB Meeting

## NHI Course on In-Place Recycling Delivered in Harrisburg, PA

By Gary Hicks, CP<sup>2</sup> Center

Steve Seeds (APTech) and Gary Hicks (CP<sup>2</sup> Center) delivered the first NHI course on in-place recycling that was developed by Applied Pavement Technologies (APTech) in 2012. The use of in-place recycling is supported by FHWA because of its cost effectiveness and it pro-

vides sustainable environmental benefits. The course was a 2 day course delivered to PennDOT personnel on Feb 28 and March 1, 2013. The course included two pre-work modules on pavement evaluation and the other on

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Working groups

in-place recycling techniques including hot in-place recycling (HIR), cold in-place recycling (CIR) and full depth reclamation (FDR). The course made use of the newest system for delivering the materials including extensive use of participant interactivity and workshops during the course. Overall the students learned about:

- The benefits of in-place recycling including economic, environmental, and engineered performance benefits
- *Project selection*- Identification of the key factors that should be considered under different traffic levels, pavement conditions and environment
- *Mix and structural design*- Identifying the key steps included in the mix design process and for pavement structural design
- *Project specifications*-Identifying the requirements for specifications and what should be included in the specifications
- *Project construction and control*- Reviewing the information on quality control, inspection, and acceptance testing to ensure successful projects



Class participants

The course is intended for state and local agency personnel who are responsible for selecting, designing, or constructing agency projects. Contractors, consulting engineers and others involved in asphalt in-place recycling could also benefit from the course.

All of the presentations were reinforced by short quizzes and detailed workshops in which the participants worked together in teams to ensure the lessons were learned well. The students seemed to enjoy the new approach very much. For more information on the course, please call 877.558.6873 or email [nhicus-tomerservice@dot.gov](mailto:nhicus-tomerservice@dot.gov).



## Communicating the Value of Preservation: A Playbook

Summarized by Brian Winter and Ding Cheng, CP<sup>2</sup> Center

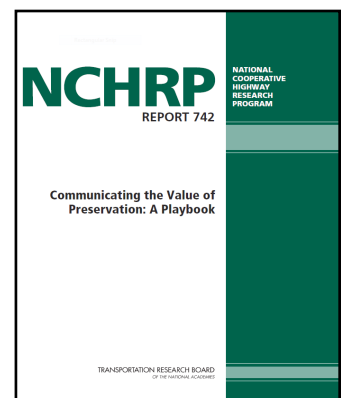
With shrinking funds and an aging infrastructure, preservation is becoming more and more necessary. This is a well known fact among DOTs, but how do you sell preservation to elected officials and taxpayers? This is exactly what National Cooperative Highway Research Program (NCHRP) report number 742, titled "Communicating the Value of Preservation: A Playbook", addresses.

The purpose of the Playbook is to provide guidance to state transportation agencies on how to communicate successfully the importance of preservation to the leaders of their agency and to the stakeholders outside the agency. Effective communication can raise not only the public's awareness of the consequences of deferring preservation and maintenance, but also address the importance of such efforts to those elected officials facing difficult resource allocation decisions.

The Playbook helps the user learn how to

execute effective market research and to formulate and deliver memorable and creative messages that will resonate with the target audience. By utilizing the Playbook, you and your agency will be able to:

- *Convey that Preservation Matters* – you will be able to shed light on a subject that does not get enough attention.
- *Get Preservation Recognized* – make preservation a priority to key influential persons.
- *Incubate a Network of Preservation Supporters* – through communication efforts, you will establish a network of



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supporters within your organization as well as externally who can provide assistance in achieving your goals.

- *Orchestrate a Call to Action* – You can inspire stakeholders to advocate action.

There are four basic and interconnected building blocks that the Playbook uses to organize your communication skills which include: (1) audience identification, (2) message design, (3) message delivery, and (4) market research. These building blocks act as guidelines that you can build your own creative communication campaign around.

### *Audience Identification*

Audience identification is often overlooked as an effective tool for communication. Identifying and segmenting audiences should be done early on so that you can determine what motivates them, what messages resonate with them, determine what information sources they trust, and what media resources will be the most effective in reaching your target audience. Audience segments may include demographics, elected officials, industry, geographic, the general public, etc.. There are four groups:

- *Promoters* – These are audience segments that set preservation as a high priority and whose actions can directly impact implementation.
- *Defenders* – Audiences that set preservation as a high priority but do not significantly affect implementation.
- *Latents* – Audience segments that see preservation as low priority and whose actions can directly impact implementation.
- *Apathetics* – Those who see preservation as a low priority and whose actions have little or no impact on its implementation.

### *Message Design*

An effective message for preservation should be seated with a strong analytical foundation but must also cut through the clutter. A message should be succinct and resonate with key audiences on an emotional level.

The best way to begin a message design is to use existing messages and available information as a baseline for your message—resources like long term plans for preservation, annual reports, performance measures, external presentations, and others such as brochures, vid-

eos and press releases. You can also coordinate with other staff who often present externally. Make your message memorable by staying positive and relevant to your target audience.

When designing your message, make sure to review your audience identification efforts, existing market research, and the best and most likely delivery methods. The condition of the existing transportation system and its maintenance history may directly impact the type of message that you deliver. In addition, avoid getting too technical, being too negative, or not making a call to action.

### *Message Delivery*

It won't matter how great your messages are if you do not use the right delivery tactics to reach your audience. Messages should be built with a "surround sound" presence that establishes a "constant drumbeat" that utilizes several modes of communication:

#### *Direct audience contact strategies -*

- Choosing a speaker with credibility
- Seek out speaking opportunities
- Fact sheets or videos
- PowerPoint

#### *Brochures and print and broadcast media - New media including online communication tools -*

- You Tube videos
- Emails lists and websites
- Social media (facebook, twitter, etc)
- Blogs and Podcasts

There are many forms of message delivery. Your DOT should try to use as many forms as possible to create a "surround sound" communication campaign. Get your message out via traditional media, on the Internet, and on the ground in face-to-face settings.

### *Market Research*

This is the building block that brings all of the other building blocks together by creating a feedback system. Would it not be poor practice for a DOT to implement preservation and maintenance without first researching the effectiveness of the technique and then to monitor its performance afterward? Communication is no different. Market research can be defined as collecting audience or

*Continued, next page*



stakeholder feedback, data, and input through the use of techniques ranging from simple comment cards measuring audience response to more elaborate polls designed to determine what words or messages resonate with a variety of audience segments.

Market research has three key aspects including:

- Formative Phase Research – this is used to help develop communications strategies by conducting phone interviews, online surveys, and review of existing data.
- Pre-test Phase Research – is a means of testing strategies prior to formulating and delivering messages. By addressing focus groups or the use of surveys, a message can be tailored to audience concerns by finding out what they care about.

- Monitoring/Evaluation Phase Research – this is research used to gauge the effectiveness of communication efforts.

Market Research is helpful at all stages of a communications campaign because it allows DOTs to know what stakeholders are thinking, feeling, and saying.

### *Create a Campaign With a Positive Message!*

For full details on how to create your own effective campaign, check out NCHRP 742, [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_742.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_742.pdf). Gaining support for funding preservation has never been more important, or more difficult, but by following the guidelines of the Playbook, you can convey the message that preservation matters and orchestrate a call to action.



## **FHWA Update** by Steve Healow, FHWA – Sacramento

**H**ave you heard of Intelligent Compaction? This technology uses global positioning, infrared temperature sensors, and custom software with user interface to enable roller operators to see real-time relative compaction on subgrade soil, aggregate base or asphalt pavement. Twelve states participated in a pooled fund study which was published in 2011. Several years ago there were two demonstration projects in southern California. This year another demonstration project is in the works for northern California. Check this space in the next newsletter for an announcement. See more information at <http://www.intelligentcompaction.com/>.

E-subscribe to the NHI: I'll bet you didn't know you could sign up for e-mail notification of new training products and services from the National Highway Institute. See the NHI web page at <http://www.nhi.fhwa.dot.gov/default.aspx>.

Got pavement edge drop-off? Would you like to mitigate for pavement edge drop-off and make it easier for errant vehicles to return to the pavement? Consider this January 2013 report from Washington DOT [<http://www.wsdot.wa.gov/research/reports/fullreports/798.1.pdf>]. It addresses frequently asked questions including best practices for compacting the tapered edge of pavement.



## **CalAPA launches 2013 edition of asphalt classes**

**By Russell Snyder, CalAPA**

**T**he California Asphalt Pavement Association (CalAPA) has announced its lineup of asphalt classes for 2013. Classes cover a wide array of subject matter and have useful information for everyone from entry-level field personnel to experienced engineers and technicians.

The classes are being held at various locations across the state. Visit the CalAPA website at [www.calapa.net](http://www.calapa.net) for dates, times and locations.

Consultant and former Caltrans senior engineer Roger Smith is teaching the popular half-day class, "Asphalt Pavement 101," which gives a good introduction to asphalt pave-

ments, from rocks and binder to what happens at the asphalt plant, on the paving job-site and eventually to testing and acceptance.

Also back is the "Quality Asphalt Paving," taught by longtime paving contractor-tuned consultant Skip Brown, who has personally supervised the placement of more than 4 million tons of asphalt in his career. In his half-day class, Brown provides the essential insight field personnel and inspectors will need to know to ensure a high-quality paving job under sometimes challenging conditions.

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**Paul Curren of Pavement Engineering teaches the popular CalAPA class on Caltrans Section 39**

A new class this year, "Understanding the Job Mix Formula," will delve into the complex world of designing just the right asphalt pavement mix for the conditions. Taught by colorful expert Paul Curren with Pavement Engineering, the half-day class will explore the various components of a JMF, best practices and recent changes

to state specifications that impact JMF acceptance. Curren previously taught the wildly popular "Caltrans Section 39" classes around the state for CalAPA.

Previous attendees to CalAPA classes have described them as "relaxed in an inviting atmosphere," "easy to understand" and "thorough and informative."

The classes are developed under the guidance of the CalAPA Technical Advisory Committee, which helps review and approve curriculum, soliciting feedback from industry experts and agency representatives along the way. The co-chairmen of the CalAPA Technical Advisory Committee are Tim Denlay with Knife River Construction and Don Goss with Valero Marketing and Supply. A future class that is expected to be announced soon will be "Quality Control/Quality Assurance."

Companies and agencies may arrange to host a class at their location. Contact Russell Snyder at CalAPA at (916) 791-5044 for details.



## Mark Your Calendar (Coming Events)



*California Asphalt Pavement Association (CalAPA) Spring Asphalt Conference* – will be held April 25 in Ontario.

CalAPA also sponsors periodic Regional Technical Meetings, training classes and other technical-related events at various locations in California where local agencies and industry representatives meet to share technical information and discuss strategies to improve asphalt pavements. The following Regional Technical Meetings have been scheduled:

March 27: Central Coast – Santa Maria

April 2: Bay Area – San Leandro

April 23: Central Valley – Bakersfield

May 8: Sacramento

May 23: Central Coast – Santa Maria

For more information visit: <http://calapa.net/>

*World of Asphalt* - March 19-21 in San Antonio, TX <http://www.worldofasphalt.com/about/>

*Maintenance Superintendents Association (MSA)*

Annual Conference & Equipment Show – September 9-13 in Ventura

MSA has several Chapters statewide that hold meetings and educational events on a regular basis. For information go to: <http://mainsupt.com/>

The *Pacific Coast Conference on Asphalt Specifications (PCCAS)*

Committee meetings - April 16 in Reno <http://www.pccas.org/>

*2013 Airfield and Highway Pavement Conference*

The Transportation and Development Institute (T&DI) of the ASCE is pleased to announce the 2013 Airfield and Highway Pavements Conference with the theme "Sustainable and Efficient Pavements". The conference will be held between June 9 and 12 in Los Angeles. For more information, go to conference website: <http://content.asce.org/conferences/pavements2013/index.html>

**OOPS!** The caption on the photo on page 2 of our previous issue (December 2012) should have said Eric Richard and Peter Fitzpatrick were with Reed and Graham, Inc.

Caltrans established the California Pavement Preservation (CP<sup>2</sup> 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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