



CP2 CENTER NEWS

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Developing RAC Performance Models and Providing Services to Local Agencies By Ding Cheng and R. Gary Hicks, CP2 Center

Developing Preliminary RAC Performance Models

The California Department of Transportation (Caltrans) and hundreds of local agencies throughout the State of California use pavement management systems (PMS) to determine which strategies to use in their pavement

maintenance and rehabilitation projects. Most PMSs use performance models to predict future pavement condition and lifespan of the various treatments. Caltrans and many local agencies in California use asphalt rubber in their pavement. Figure 1 shows a rubberized hot mix project on SH 99 by Caltrans. In order to quantify the potential performance and cost benefits of using rubberized asphalt concrete (RAC) over-

lay for local agencies, CalRecycle funded a research project for CP2 Center to develop RAC performance models.

The CP2 Center reviewed models used throughout the United States and recommended which models would be most appropriate for this study. The Metropolitan Transportation Commission (MTC) StreetSaver and Stantec RoadMatrix models were recommended for use by local agencies while Ohio and Arizona DOT approaches were recommended for use with the Caltrans pavement management system to convert individual distresses to a Pavement Condition Index (PCI). Without the PCI data, it is difficult to evaluate the pavement network and to answer the important "What if" questions such as:

- What will the overall condition of the network be, if the State continues with the current level of maintenance for the current funding?

- What will the overall condition of the network be if the maintenance and funding drops below a certain level?
- How much funding is needed to improve the overall network conditions to a specific PCI?

For example, the CP2 Center worked with local agencies and MTC in the Bay area to document the performance of rubberized asphalt concrete (RAC) pavement sections. The Center utilized the pavement preservation

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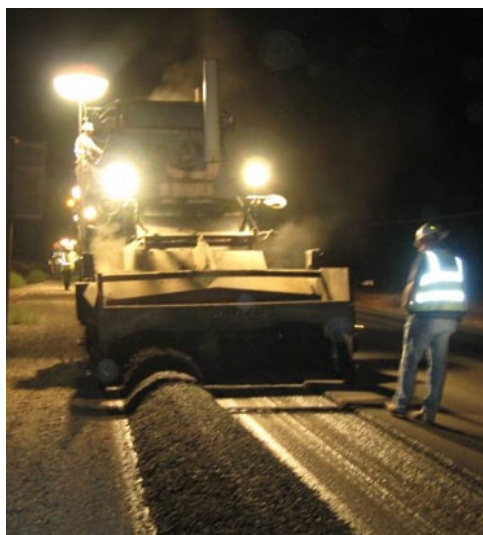


Figure 1. Paving RHMA-G near Butte PM 44.4 by Caltrans District 3

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database and MTC pavement management system, StreetSaver®, which was originally developed in the early 1980's and includes three main elements: a PCI procedure, a maintenance and rehabilitation decision tree that assigns appropriate treatments, and a network level multi-year prioritization process that uses a weighted effective rating.

In order to perform the multi-year prioritization process, the StreetSaver® program includes performance models to predict future pavement condition.

The StreetSaver® program uses a sigmoidal (S-shape) model to describe pavement condition progression which is a more realistic depiction of pavement deterioration. Additionally, the models have the capability to adjust the PCI when maintenance and rehabilitation treatments are applied. The independent variables used in these models include functional class (as a surrogate for traffic volume) and pavement surface type.

It is well-documented that RAC provides a better performance than conventional HMA pavement in terms of better resistance to reflection cracking, better durability, and lower noise. It is expected that the performance curves of HMA Rubber pavement are significantly different than those of conventional HMA pavement and overlays; however, this is not represented by the existing performance models in the StreetSaver® program. The CP² Center conducted non-linear regression analysis using the historical performance data of RAC pavements and generated RAC performance models for arterial, collectors, and residential streets.

Figure 2 depicts a comparison of the conventional asphalt pavement for arterial streets to RAC for arterial streets. As shown in Figure 2, it is clear that the RAC has the longer life for the arterial streets in the San Francisco Bay area. Due to the lack of long term RAC performance data, some southern California data was utilized for the long term performance. As the pavement reaches a later stage

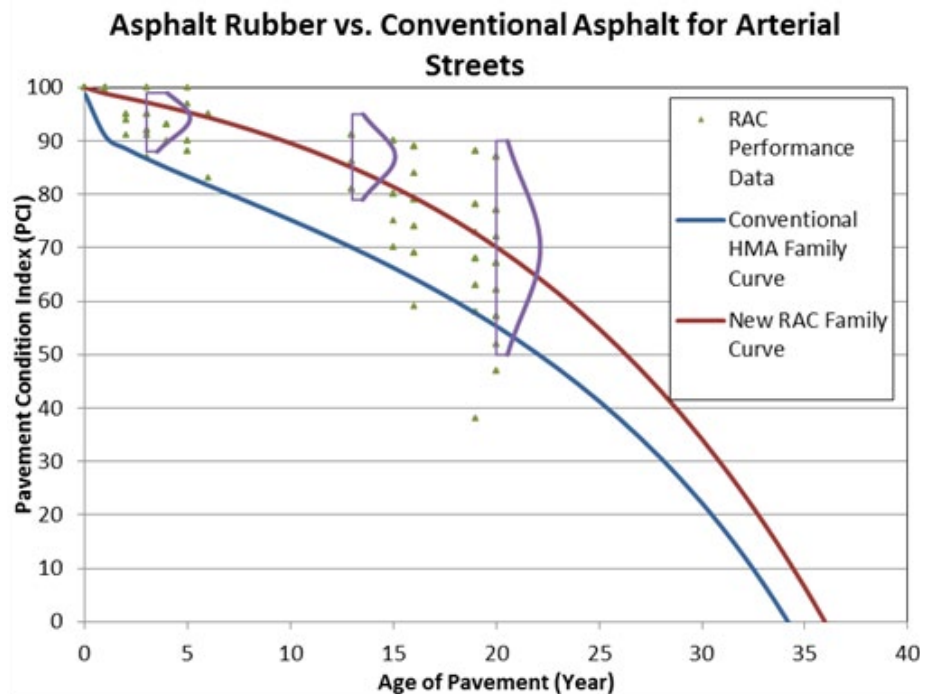


Figure 2. Changes in PCI for both Asphalt Rubber and Conventional Asphalt Arterial Streets

in life, the PCI has a larger variance as showed in Figure 2. A normal distribution was assumed for the variations of PCIs at different pavement ages. The curves of normal distribution are shown in the figure at ages of 3, 13, and 20 years, respectively.

Figure 3 shows another example of the developed RAC performance models for Stantec RoadMatrix program used by the City of Sacramento. The performance of Surface Distress Index (SDI), which is similar with the PCI of StreetSaver, can be modeled under different asphalt concrete pavement thickness, traffic level, and pavement foundation condition.

Models were also developed to convert the individual distress forecast by the Caltrans Pavement management program into a PCI value. These models still need additional work because of the limited number of projects contained within the Caltrans database.

All reports have been submitted to CalRecycle and once they are approved, they will be posted to the Center's website.

CP² Center Plans to Provide RAC Testing Services to Local Agencies

The Center has laboratory facilities that are available for use on studies related to local agency issues and problems. Currently, the facilities include the following:

- Asphalt laboratory for both binder and

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mix testing

- Concrete laboratory for testing cements, aggregates, and portland cement concrete
- Soils laboratory for testing soils

The Center's asphalt laboratory has been developed over the past few years and the lab is certified by Caltrans. The Center has the capability to conduct Superpave binder testing including PG grading, and Superpave mix design such as Gyratory Mix Compaction, Bulk Density, Rice Density, Hamburg Wheel Track Testing, and 4-point Beam Fatigue Test.

Because part of the equipment was sponsored by CalRecycle, local agencies could request these lab testing services through CalRecycle or Quincy Engineering that is supporting CalRecycle with its RAC grant program. The CalRecycle contact is Nate Gauff (Nathan.Gauff@CalRecycle.ca.gov) while the Quincy Engineering's contact is Theron Roschen

Variation of SDI for RAC after Construction

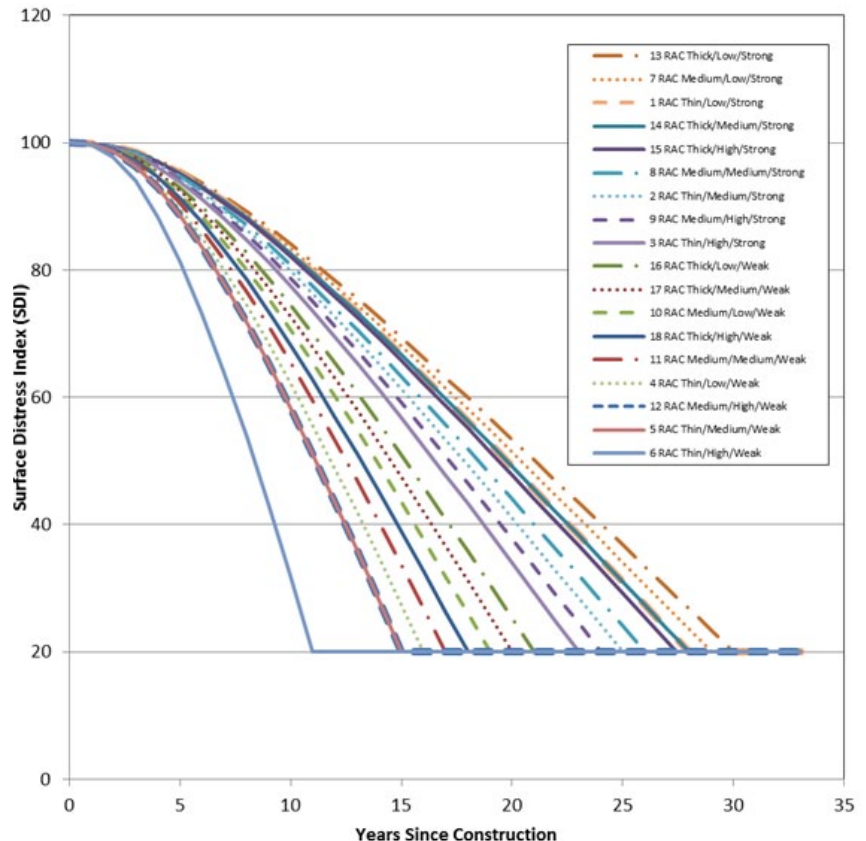


Figure 3. The Changes of SDI for Varying Structure types of RAC after Varying Year of Construction

(theronr@quincyeng.com). For more information, please visit CP² Center's website at <http://www.cp2info.org/center>.



CalAPA Spring Asphalt Pavement Conference By Roger Smith, CP²C

Almost 250 asphalt people gathered in Ontario on April 9-10 for the CalAPA "Spring Asphalt Pavement Conference and Equipment Show". They were treated to a lineup of interesting speakers on timely topics and to a display of specialized equipment, ranging from a behemoth paving "shuttle buggy" (MTV) and other paving equipment, to sophisticated asphalt laboratory testing equipment and high-speed pavement profile scanners. In all, over 25 exhibitors were on hand during the entire event.

According to Russell Snyder, CalAPA Executive Director, the equipment show and vendor booths were such a success, they will become a regular feature of future conferences. In fact he stated;

"Our attendees tell us our conferences are a great way to stay current on rapidly changing technical issues, get a preview



Exhibit Area during Recess

of upcoming work and trends, and develop valuable business relationships,"

Snyder said.

"Expanding the Conference to include an equipment show, reception and lab tour greatly enhanced the learning opportunities for everyone."

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**Steve Takigawa
of Caltrans**

Keynote speaker Steve Takigawa, Caltrans Deputy Director of Maintenance & Operations, used this popular event to roll out Caltrans' new mission statement:

"To provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability".

He conveyed that because of the very noticeable and measured improvements to the highway system, Caltrans has been able to garner almost \$600 million in additional funding, with a whopping \$300 million dedicated to cold in-place recycling (CIR). He cited the Caltrans "State of the Pavement Report" for 2013, and also invited everyone to check out the new Caltrans magazine, "The Mile Marker", which can be found at: http://www.dot.ca.gov/ctjournal/2014-1/TheMileMarker_Jan2014.pdf.

Steve Healow of FHWA, California Division, outlined FHWA's take on the impacts of the recent rulings regarding the Americans With Disabilities Act (ADA), which would require curb cuts and ramps for thin surface treatments such as microsurfacing, but not for slurry seals. He noted that agencies must prepare "transition plans" for complying with the rulings, but in situations where they can show "undo cost or hardship" to comply, they may be able minimize the impacts of the new ADA criteria.

The environmental "sustainability" of asphalt pavement was the timely topic of another featured speaker, Heather Dylla of the National Asphalt Pavement Association (NAPA). Citing that sustainability could become a factor in pavement type selection (HMA vs. PCC), she reviewed the many "green" aspects of asphalt pavement including warm mix technology, recyclability, traffic noise

reduction, porous pavement for minimizing run-off, and the incorporation of asphalt roofing shingles into paving mixes. Several "environmental" rating systems (e.g. "GreenRoads") for construction projects are now available that will enable "cradle-to-gate" (truck dump gate) environmental comparison of

alternative pavement construction strategies.

Gary Hicks of our CP² Center presented an overview of the new Strategy Selection software that was developed by the Center. The program will help users compare and select appropriate pavement maintenance strategies based on life cycle cost analyses. It's available at: <http://www.csuchico.edu/cp2c/Strategy%20Selection.shtml>.

With Caltrans heading toward implementing Superpave mix design in July of 2014, Toni Carroll of Vulcan



Toni Carroll of Vulcan Materials

provided a very comprehensive overview of the many new aspects of the Superpave mix design test methods and specifications for HMA. Paving mixes will likely look a bit "rockier" due to somewhat coarser gradations, the use of more angular (crushed) aggregate, and a specification for voids-in-mineral aggregate (VMA). Mix design work in the lab will require a gyratory compactor machine for making trial mix specimens, and Hamburg Wheel Tracking (HWT) device to test a mix's resistance to rutting and moisture sensitivity and stripping. (See related article in this newsletter.)

Other speakers and topics rounding out the CalAPA Spring Conference included:

- Jeff Ensel (Astec) - Using milling machines for achieving smoothness
- Peter Vacura (Caltrans) - Caltrans smoothness testing: the switch from Profilograph to the Inertial Profiler
- Ed Lyon (RMA) - Mix Design & Compaction Overview
- Steve Marvin (Labelle-Marvin) - Non-Destructive Testing (NDT) for pavements (e.g. ground-penetrating radar and deflection testing using the FWD)
- Pascal Mascarenhas (Vulcan) - Using RAP & RAS recyclables use in HMA

All of the presentations are available on the CalAPA website: <http://calapa.net/>. CalAPA's Fall Conference & Equipment Show will be held in October 2014 in Sacramento.



**Heather Dylla
of NAPA**

Superpave Arrives In California By Toni Carroll, Vulcan Materials

It's 2014 and Superpave has officially been integrated into Caltrans' specifications for hot mix asphalt. On April 18, Caltrans released a Revised Standard Specification (RSS) to the 2010 Standard Specifications that incorporates California's version of Superpave into our everyday lives. Are you ready? If you're a contractor and haven't had the chance to dive into 45+ pages that make up Section 39, "Hot Mix Asphalt", the following are the major highlights that you should be aware of.

The first thing you'll notice is there is no longer a "QC/QA" Process option. Most of the jobs under the new RSS are now what we refer to as "Standard" Process jobs, the rest are smaller "Method" Process jobs. This means that there is no longer a pay bonus available on Caltrans jobs. So if you have been bidding your jobs with one, you may need to re-evaluate your methods. You will also probably need to add dollars to your bids because Caltrans now requires the contractor to have a quality control (QC) technician on site to test for compaction with a nuclear gauge - 3 test sites for every 250 tons. These tests will not be used for acceptance (cores will still be used), however, you will need to turn your test results in to the state. This specification was added because Caltrans was seeing good contractors,

who were proactive with quality and performed QC density testing, losing bids because of the added cost to pay for a special technician. This specification is meant to level the playing field in bidding while encouraging contractor QC testing and high quality work.

But behind the scenes is where you'll see the majority of the changes. The new specifications bring two new pieces of equipment to the HMA laboratory - the gyratory compactor and the Hamburg Wheel Tracking device. The gyratory compactor

is Superpave's replacement for the California Kneading Compactor. The two machines compact using quite different methods. The Kneading Compactor uses a heated tamping foot that presses down in various places around the briquette specimen, or "puck", using a kneading motion. The Gyratory compactor compacts the puck in a circular fashion

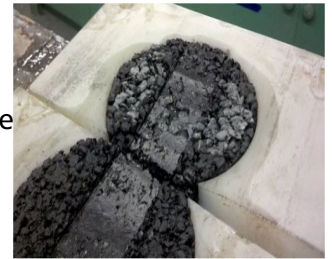
using a "gyrating" motion.

The stabilometer (Stability) test used in the Hveem specifications is being eliminated because of Superpave. The Hamburg Wheel Tracking Test will be used to assess moisture sensitivity, as well as give California a test for rutting potential under wet conditions. The test runs a weighted steel roller back and forth over the submerged sample for a set number of passes. The depth of the rut is monitored, as well as indications of possible moisture sensitivity (stripping). Both of these pieces of equipment, in conjunction with slightly different gradation and volumetric specifications, will force many HMA producers to develop new mix designs and reevaluate their processes and aggregate deposits.

The up-front R&D costs for a producer will likely be high if they intend to keep their asphalt binder contents low. A study performed by U.C. Davis for Caltrans found that if no changes were made to the material gradation, and producers attempted to use the same mix designs as with the kneading compactor, the asphalt contents in their mixes would need to be increased to maintain proper mix volumetrics.

What many producers are finding is that Superpave requires a "coarser" mix than we've been used to in order to develop a long lasting, high quality mix design. Where contractors may have thought that the change from "old Section 39" to "new Section 39" mixes was a major change in coarseness, they will be seeing yet another move towards even coarser mixes. It will be important to educate customers on this difference between the new specifications and the old Hveem mix designs to ensure that material is not returned to the plant based on visual inspection and the assumption that the mix is coarser than it should be.

In addition to ensuring economically feasible asphalt contents, the new specifications will force many sand and gravel producers to evaluate their aggregate deposits and processing plants. Superpave relies heavily on high percentages of crushed,



Hamburg Wheel Tracking Specimen



Gyratory Compactor

angular material. The new specifications require more of the mix's particles to be crushed, as well as more surface area of each particle to be crushed. Fine Aggregate Angularity testing is no longer only specified if >10% natural sand is used. It's now required on all mixes.

I've only hit on a few of the broader changes in the new Section 39 Superpave RSS here, but it is recommended that you take the time to

read through and understand the specifications when you find a spare moment. This will likely be a large change to how we do business, and knowing the specification before it becomes a defective material claim will make a big difference. Good Luck!

For more information contact Toni Carroll at: carrolla@vmcmail.com.



Use of Multi-layer Systems by Local Agencies in California

By Patrice Theriot, City of Watsonville and Gary Hicks, CP² Center

Several agencies in California are using "multi-layer" maintenance systems to maintain their local roads. At the 2014 California Chip Seal Association (CCSA) meeting, the City of Watsonville presented information on their practices, and the County of Mendocino also received an award for their use of this type of system. The City of Fort Bragg also has experience with this system.

Essentially a multi-layer system consists of the application of a microsurfacing over the existing asphalt pavement followed by the application of an asphalt rubber (AR) chip seal. This is followed by the application of a slurry seal surfacing. These types of treatments have been used on projects with Pavement Condition Indexes (PCI's) as low as 20 to 40. The City of Watsonville started using this product in 2004 with an AR chip seal as the intermediate layer. They have also used polymer modified chip seals, but their normal practice is the use of AR chip seals.

As an example, the treatment was used in 2004 on Industrial Road in Watsonville. The road was in poor condition. Figure 1 shows



Figure 1 Multilayer system placed in 2004, Industrial Road (Note original condition)

one small portion of the project in 2014 where a patch peeled up in the wheel tracks revealing the poor condition of the original underlying pavement. The rest of the pavement with the multi-layer system was performing well, as shown in Figure 2, after 10 years. Similar multi-layer treatments have been used on numerous other projects with the same good result over badly cracked asphalt pavement. Originally, this treatment was used on the poorer pavements as a temporary fix, but it has proven to provide service lives of up to 10 years, to date.

The multi-layer systems cost about \$7 per square yard. The alternative of an HMA overlay, at substantially greater cost. Other benefits have included very little surface preparation, minimal traffic disruption, no utility work and ADA compliance, at least during this period. Unfortunately, this treatment according to the new DOJ regulations, would require the costly construction of curb ramps, which might eliminate this successful treatment from the tool box of local agencies.



Figure 2 General condition of Industrial Road in 2014 after 10 years.

From the City of Watsonville's perspective, here are some additional considerations for using a multi-layer system:

Pros

- No crack filling required. The microsurfacing fills any alligator cracking (actually performs best on heavily "alligatored" pavement).
- Inexpensive compared to mill-and-fill
- No material milled (RAP) that requires disposal.
- Street looks new when project is complete.

Cons

- The multi-layer system does not correct structural or base failures
- Street is closed while work is being done, and while material cures or dries
- The finished surface is not as smooth as new HMA.
- The multi-layer system does not correct

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the profile of the finished surface.

Other considerations during design and construction:

- Ambient temperature should be warm when applied. This can be an issue on the coast where daytime temperatures can be in the 50's and 60's for much of the summer. Choose a product that can be applied at your local temperatures. For example, choose an asphalt for chip seal binder that is appropriate for your maximum and minimum average temperatures. This is a balance between having the binder remain stable in hot temperatures, but not get brittle and crack in the cold.
- Intersections with predominant turning movements (as opposed to straight through traffic) may "shove" or scuff over time, especially in hot weather. These intersections may not be an appropriate choice for the multi-layer system.
- More is not necessarily better. If too much material is applied, the excess will



need to be swept up. Excess aggregate will be tracked by tires and carried to nearby streets as well. This issue generates most of the calls from the public.

The County of Mendocino and City of Fort Bragg have also used the multi-layer treatment successfully on a number

of projects. All of the agencies have been extremely pleased with the performance of this preservation treatment. In fact Craig Angell of Mendocino County accepted an "Award of Excellence" at the 2014 CCSA meeting for one of their projects placed in 2013. A number of contractors in the state have placed this treatment.

It's important to continue to develop innovative maintenance treatments that provide a smooth ride, and perform well on City Streets and County roads.

For more information on the multi-layer systems please contact Patrice Theriot at the City of Watsonville patrice.theriot@cityofwatsonville.org or Craig Angell at the County of Mendocino angellc@co.mendocino.ca.us.



Valley Slurry Seal (VSS) Holds Pavement Preservation Seminars

By Roger Smith, CP² Center

The VSS companies hosted an informative and timely seminar in Sacramento on February 25. About 90 people from various local agencies heard a line-up of speakers covering a variety of topics related to pavement preservation, with the primary focus being chip seals and slurry / microsurfacing. A second seminar was held on March 26 in Moraga.

Gary Houston, of VSS welcomed the group and provided an interesting look at the state of asphalt supply and marketing in the U.S. and California today. He projected that considering there are fewer asphalt refiners left in California, and the fact that the oil from 'fracking' operations (e.g. North Dakota) is usually not a good source of asphalt, it seems likely that the supply of asphalt will tighten and the price will go up. This will make cost-effective pavement preservation treatments more important than ever.

Other VSS speakers covered topics such as bidding and estimating projects, advances in slurry and microsurfacing, hot vs. cold chipseals,



Jon James of VSS explains slurry truck calibration process.

and multi-layer systems, which combine microsurfacing and chip seals. A slurry truck was onsite for discussion of proper calibration methods.

More of these very informative seminars are planned. For more information contact Gary Houston at: gary.houston@slurry.com



An Inspector's Tips for Slurry Seals and Chip Seals

By Joe Romer, Retired from City of Roseville and County of Sacramento

As a retiree and now inspecting for the City of Rocklin on preventative maintenance pavement seals, I'll offer some pointers that will help lead to successful projects. The following bullet points may be 'old hat' to some, but could be useful to others new to these pavement maintenance strategies.

- Education on the pavement treatment and process that the Design Engineer has specified is the most important tip I can offer. There are conferences, seminars, websites and professional organizations that can help an Inspector review and refresh technical information. The Caltrans Maintenance Technical Advisory Guide (MTAG) is available at http://www.dot.ca.gov/hq/maint/MTA_Guide.htm. The International Slurry Surfacing Association (ISSA) (www.slurry.org) has several .pdf files that can be downloaded that explain the slurry seal and micro-surfacing processes. The Asphalt Emulsion Manufacturer Association (AEMA) (www.aema.org) is another source of information on asphalt emulsions. The list of information available is quite extensive. Training classes are also available through the Institute of Transportation Studies (ITS) (www.techtransfer.berkeley.edu). Usually, help and information are just a phone call away - from other agencies or from experienced contractors and manufacturers. Use them.
- Your agency's Specifications and Special Provisions should be clear, concise, complete, and as consistent as possible. Avoid ambiguous statements that could be interpreted in different ways.
- Prior to starting the work, calibrate the application equipment to verify the application rates will be as specified. Also, verify these rates in the field by the prescribed method for that application. For example, to ascertain the application (shot) rate of emulsion for a chip seal, 'stab' the distributor truck before and after a measured area of application, and do the math to determine the gallons

per square yard. Once the application rates have been set, understand that it is always an average of what is being applied. Also, application rates may need to be different from street to street due to the texture of the existing pavement surface.

- Testing of materials as submitted is very important. Employ a lab that can perform these tests, and then test consistently and often - and split the samples with the contractor. Become familiar with the test procedures - for example, gradation of aggregates, polymer content of the emulsion, and torsion recovery of the asphalt emulsion's residual asphalt. Understanding the testing results will assist in assuring that the materials being applied meet expectations.
- Obtain field samples of the materials used in the project. Even if they're not tested, retain them in case of future problems. Be mindful that asphalt emulsions have a fairly short shelf life, and should be tested within a few days of sampling.
- Understand the operation of the equipment used to apply these treatments. Most chip seals are applied with Computer Rate Controlled (CRC) distributor trucks and chip spreaders. Usually these are fairly accurate, but should be verified via field yield calculations. Slurry seal trucks work off the principle of revolutions of the feed belt to the pug mill with additives, emulsion, and aggregate metered in. The main thing to remember is the higher the gate setting the lower percent of emulsion and lower the gate setting the higher the percent emulsion.

The way I make these adjustments is to divide the weight of emulsion per revolution by the percent (as a decimal) of emulsion desired. For example, if the mix design requires 15% emulsion and the pounds of emulsion is 18 pounds per revolution ($18/0.15 = 120$), then the metering gate needs to be set at 120 pounds of aggregate *Continued, next page*



for that specific slurry truck. With calibration sheets, changes in the field can be made to obtain the optimum mix. The application (spread) rate for slurry seals is dependent on the strike-off of the drag box being set to yield the desired pounds per square yard. This should be field verified through yield calculations. Do it several times and take the average, and then secure the adjustment screws.

- Workmanship and appearance of the final product is vitally important and the thing most visible to the public. Sloppy application – such as irregular lines at gutter lips or rough joints - will generate future calls to the Engineer for explanation.
- Posting and notification about upcoming street closures and traffic controls should be done early, and as often as necessary
- Traffic must be controlled. Chip seals are more forgiving, but I have witnessed vehicles driving in the fresh emulsion and following the distributor truck. Slurry seal contractors also need to protect their work and keep vehicles out of fresh slurry seals. In parking areas and cul de sacs, power steering movements and tight turns can be especially damaging and produce “scuffing” of a fresh treatment.



Poor edge control of slurry seal at gutter

Longer closures and rolling can help minimize this.

- In chip seal work, rolling speed is a major concern and one item that is highly stressed to our contractors. Speeds should not exceed 5 mph to prevent chip pick-up or roll-over. Two roller passes are usually adequate to embed the chips. Some agencies also require rolling of their slurry seals. This is done mainly to set the rock at or near the gutters or in other areas where there is less traffic. Also, this helps reduce raveling, and/or “scuffing” of a fresh slurry seal.
- Lastly, document, document, document! Inspectors should keep diaries and photos that document the equipment and

materials used, and any problems encountered. Paper work for slurry mix designs, material sources and truck calibrations should also be kept on file.

In conclusion, the tips that have been shared are just a few ideas or observations that have helped make successful projects. There are certainly many more that

others may have. Please share these tips with others and try to pass along your own experience and knowledge. We all have the same goal – a quality pavement treatment.

For more information contact Joe Romer at: romer@att.net.



Hot Topics in Hot Mix Asphalt by CalAPA

By Rita Leahy, CalAPA Technical Consultant

At a well-attended event on June 5th in San Leandro, a number of “hot topics,” which affect industry and user-agencies were highlighted. Sponsored by CalAPA’s Bay Area Technical Committee, the one-day event featured presentations on Superpave by Joe Peterson of Caltrans and Toni Carroll of Vulcan Materials. With Caltrans Superpave implementation scheduled for July 1, 2014, this topic was of particular interest. Mr. Peterson focused on the new equipment and specification changes and Ms. Carroll provided insight on the economic impacts to the private sector including costs associated with capital equipment, mix design and laboratory accreditation.



Figure 1. Steve Healow Gave a Presentation at the Hot Topics Event

As shown in Figure 1, Steve Healow of the FHWA provided some sorely needed clarification on the recent DOJ (Department of Justice)

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– DOT (Department of Transportation) implementation of the Americans with Disabilities ACT (ADA), specifically the requirements with respect to curb ramps when streets, roads or highways are altered through resurfacing. The confusion and frustration evolves from the definitions of “maintenance” and “alteration.” For purposes of the DOJ-DOT ruling, fog seals, slurry seals and chip seals are categorized as “maintenance” and do not trigger curb ramps, whereas micro surfacing is categorized as an

“alteration,” and does require a curb ramp. Needless to say, the budget impacts on agency maintenance budgets are substantial. Wrapping up the day, Rita Leahy hammered home the importance of HMA compaction on pavement performance and reminded the attendees of potential economic savings associated with the use of RAP (reclaimed asphalt pavement) and RAS (reclaimed asphalt shingles).



Elastomeric Concrete Speeds Runway Patching

By Craig Hennings, SWCPA, and Ben Jacobus, D.S. Brown, Inc.

Runway repairs are a tricky maneuver. Like on a busy highway, high priority repairs must be made quickly, at off-peak times, using materials that quickly reach a high strength. Not only must the repair materials handle the repeated loading of large, heavy airplanes, they also need to withstand fuel spillage and de-icing chemicals.

Detroit International Airport, which sees heavy airplane traffic as well as weather extremes, is one of many airports that have turned to using a highly durable runway patching material. Houston Intercontinental, Washington Dulles, Los Angeles, Orlando, Dallas/Fort Worth, Minneapolis/St. Paul, and John F. Kennedy International airports have also found that using a strong, durable material will add years of service to the runway.

Common runway repairs include pot holes, joint spalling and raveling, repairs around manhole and utility covers, lightning strike damage, corner cracking, and conduit back-filling. Choosing durable, permanent repair materials is necessary to minimize future maintenance and to minimize Foreign Object Debris (FOD) problems that can cause airplane damage.

Choosing the Right Material

Often, cementitious or other rigid, partial-depth repair products are used to repair spalls in concrete pavements. The problem with these products is that they are also brittle and can crack under direct heavy impact or because they have a different coefficient of expansion than the surrounding concrete. If the strength and the rate of expansion and contraction of the patching materials significantly differ from the material being repaired, it is inevitable that one or both of the materials will fail. Conversely, asphaltic and other softer

patching materials often lack the strength to hold up to direct traffic impact. Elastomeric concrete is a permanent solution because it has the ideal combination of strength and elasticity, even under bitterly cold conditions. Elastomeric concrete is a two-part polyurethane patching material mixed with proprietary aggregates. It has been specified and installed on airport runways and highways since 1983. Some of the advantages of using elastomeric concrete are its high load-bearing capacity - it handles the weight of C-4s, 747s, and heavy truck traffic - and it has outstanding anti-spalling properties. It also resists high impact loads and repels commonly used chemicals such as ASTM Oil #1, ASTM Fuel A, ethylene glycol, freon, isopropyl alcohol, JP-4 jet fuel, silicone grease, sodium chloride (salt), and mineral oil. It is considered easy to install, and is flexible, allowing it to deflect as the surrounding concrete expands and contracts, rather than destroying the neighboring concrete.

Elastomeric concrete can even be used to repair irregular areas. The patch shape does not need to be rectangular or square. Triangles and random shapes also work, but these non-standard shapes are typically not good for traditional repair products. Elastomeric concrete is self-leveling and has a rapid cure time, which is essential on runways. It has proven to be a strong, durable repair product that can even outlive its surrounding concrete.

Beale Air Force Base

Performing concrete repairs on airport runways is always a time-sensitive operation and perhaps even more so for military runways. Recently, Beale Air Force Base, located approximately 8 miles east of Marysville, California, began a project to repair concrete spalls on its

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runway. "Spiderweb" cracking had developed in the original partial-depth repairs, so another repair solution was needed. Time was a critical factor. Ongoing military operations at the base required quick, efficient repairs. The airfield had to receive traffic on the very same day repairs would be made. Diversified Concrete Cutting of Sparks, Nevada, was contracted to perform the 485 square feet of spall repairs. Based on experience with similar repairs, Diversified recommended Delpatch™ Elastomeric Concrete as the solution for all spall repairs on the runway. Manufactured by D.S. Brown, Inc. of North Baltimore, Ohio. Delpatch is a two-part polyurethane patching material mixed with proprietary aggregates. It provided the right combination of strength and elasticity, while offering high impact-resistance needed for a runway.

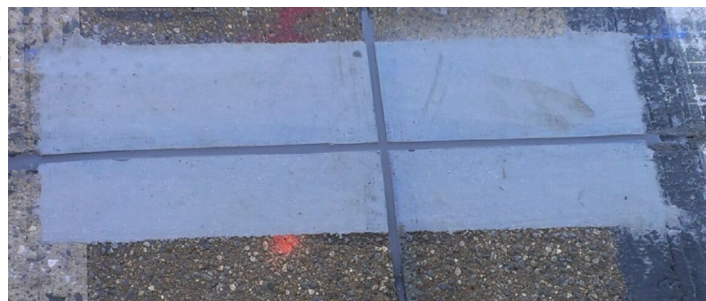
Repair Process at Beale AFB

To begin the repair process, Diversified's crews saw cut around the spalled areas and then chipped out the damaged concrete until they reached sound concrete. Repairs were made in partial depths, typically 2 to 4 inches. In some areas, workers had to repair up to a 9-inch depth. But Delpatch is designed to accommodate varying repair depths.



Spall Repair Preparation

After sandblasting, the repair area was blown out with compressed air. Because of Delpatch's fast setting time, the concrete had to be completely ready to receive the patch before the product was mixed. With the concrete prepared, workers mixed the product with a drill in 5-gallon buckets. First, Delpatch Part A and B were mixed together, and then aggregate was added to it. When fully mixed, after about a minute, workers poured mixture into the repair area, brought it to grade and troweled it to make it even. Total working time, from adding Parts A and B,



Completed Spall Repair to initial set is approximately 5 to 10 minutes, depending on temperature. Within an hour, the patch was ready for airfield traffic, which proved essential to the military base's requirements. Where patching spanned joints in the existing concrete, a new joint was sawcut to match the existing.

To accommodate military operations and flight schedules, Diversified could work only on the weekends, and planes were often landing the same day a patch was placed. Adding to the challenge, California's high springtime temperatures often caused pavement surface temperatures to reach 118 degrees or higher during installation. Work was completed despite the inhospitable jobsite conditions. The patching work began in March 2013 and completed two months later in May.

Lessons Learned at Beale AFB

The Beale AFB project demonstrates the effective use of flexible elastomeric concrete repair products for partial-depth repairs. These products unique chemistry provides a flexible patch that deflects as surrounding concrete expands and contracts, rather than destroy it.

With less tolerance today for downtime on airfields, airfield managers must consider numerous factors when making decisions. Of course, safety is always important, and life-cycle cost must also be considered.

"The repairs have made the runway much safer for aircraft," said Gerald Pannell, Civil Engineer, Beale AFB. "We have established a higher standard for spall repairs using Delpatch material and the subcontractor Diversified Concrete."

With the highest-priority repairs now complete, Beale AFB plans to continue tertiary spall repairs in 2014, as funding permits.

For more information on elastomeric concrete contact Craig Hennings of SWCPA at: chennings@swcpa.org.



Los Angeles County Demonstrates Concrete Grinding on Urban Concrete Street

By Erik Updyke, P.E., LA County Department of Public Works



1928 age stamp on pavement

For many years, concrete streets in urban areas which had a rough ride or displaced slabs were often overlaid with asphalt concrete resulting in a composite pavement which required regular resurfacing to mitigate the inevitable reflective cracking. Many of us have noticed the improvement in smoothness and noise reduction which results from a Caltrans project on a concrete freeway in which failed slabs have been replaced and the pavement received grinding. The Los Angeles County Department of Public Works wanted to determine if a typical freeway strategy could be successfully used on an urban street.

Slauson Avenue between Compton Avenue and Alameda Street in the unincorporated area between the City of Los Angeles and the City of Huntington Park offered a demonstration opportunity. This segment of Slauson was constructed in 1928, yet had never been overlaid or reconstructed.



Grinding operation on Slauson Ave.

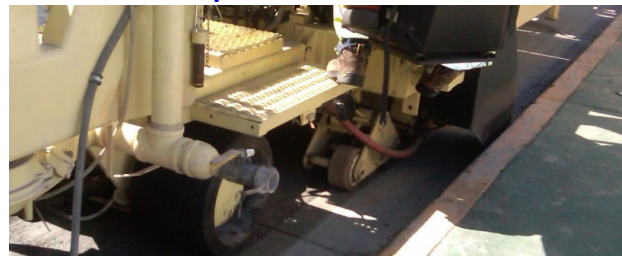
Though still serviceable and structurally adequate, motorists experienced a rough ride due to the settlement of numerous trench cuts, slabs which needed replacement, and displaced joints. A rehabilitation project was programmed and pavement grinding and slab replacement was selected as the scope but potential concerns remained about noise generated by the grinding equipment and the disposal of concrete residue slurry generated by grinding operations.

The generally industrial and retail project location, as well as the adjacent active railroad line, provided a buffer be-

tween the project location and the closest residential areas. The special provisions contained noise limits for grinding equipment similar to what is in the Caltrans Standard Specifications. Prior to advertisement, an active Caltrans project was visited. Grinding and residue collection operations were observed and noted. The special provisions required preparation of a residue management plan detailing the



After grinding and restriping



Close-up of grinder

grinding subcontractor's plan to capture and dispose of the residue slurry.

The project scope consisted of almost 71,000 square feet of new 10-inch thick concrete pavement, replacement of curb and gutter, sidewalk, and driveways at various locations, almost 172,000 square feet of concrete pavement grinding, and other miscellaneous work. The full-width of the pavement was ground. Including the newly constructed concrete pavement. Sully-Miller Contracting Company of Brea was the prime contractor and performed the concrete work. Harber Companies of San Bernardino was the concrete grinding subcontractor. The contract amount was \$885,000.

The traffic volume and adjacent parallel streets suitable for detour routes allowed for complete closures between blocks during grinding operations during normal working hours. Harber had three grinding machines in operation and multiple tankers on site to collect the

residue. The residue was vacuumed up immediately and no remaining residue was visible during grinding operations. No complaints regarding noise were received.

The project was started in November 2012 and completed in mid-March 2013. The project was considered very successful. A strategy

commonly used on freeways was demonstrated to be appropriate for an urban concrete street. Not only was the ride and function of the roadway improved, but the grinding improved the aesthetic appearance. In the future, the County intends to do a similar scope of work on other concrete streets.

For more information contact Erik Updyke at: eupdyke@dpw.lacounty.gov.

Big MSA Conference Is In The Works By Roger Smith CP² Center

The Maintenance Superintendents Association (MSA) will be holding their 46th Annual Training Conference and Equipment Display in Sacramento, September 29 – October 2, at the Double Tree Hotel. The fall event is hosted by the MSA's North Central Valley Chapter and will have a special emphasis on training. Pavement related training topics will include asphalt pavement basics, paving best practices, pavement preservation strategies, chip seal best practices and new products for streets. Another highlight will be the Playground Safety Inspector certification, and in-depth training sessions on storm water management (QSB/QSD). Of course many other training sessions will also be offered on items such as chainsaw safety, inspector practices, ladder safety, pesticide use, flagger certification and employee supervision. Many of these sessions will also provide continuing education credits.



There will also be a big outdoor vendor display area featuring the latest in equipment and products commonly need in maintenance operations by public agencies and contractors.

Lyle Waite, City of West Sacramento, is the, 2014 Conference Chairman and says, "In 2009 the North Central Valley Chapter hosted a fantastic conference that everyone who attended raved about.

This time, in 2014, we have raised the bar even further and our committee has planned a conference that promises to be nothing short of phenomenal. We feel quality training is the key, and we've put together a program of rich training by experts in their field."

This is a "must see" event for public agency maintenance workers and their contractors.

For more info go to <http://www.mainsupt.com/conference/conference.html>.



Enzyme-Stabilized Road Base

By Dr. Maureen Clemmons, IEC Distributing, LLC

Glenn County is located in upstate California approximately 100 miles north of Sacramento along Interstate 5. Glenn County Public Works maintains 862 miles of roads, of which 700 miles are paved. The County is bordered along the east side by the Sacramento River and stretches west into the Mendocino National Forest up to elevations of 6,000 feet. This rural agricultural county has experienced flat-line funding for maintaining roads over the past twenty years. Four disastrous storms wreaked havoc on Glenn County roads in the 1990's. Flooding weakened the existing road bed, which could not sustain normal traffic loads resulting in potholes, rutting and severe cracking of asphalt surfaces. Often times the damages do not show up during the disaster assessment and only appear after the saturated road bed has dried out. With a depleted road budget, Public Works Staff were looking for methods to stretch maintenance dollars for maximum efficiency. One of their options is using enzyme treatment to stabilize the road base on unpaved roads.

In 1998 Glenn County began using an enzyme-based stabilization product called Perma-zyme on select gravel roads. Perma-zyme is produced by International Enzymes of Las Vegas and distributed internationally by International Enzymes Consulting (IEC) and Distributing, LLC. Perma-zyme can be used effectively with a wide range of aggregate material containing approximately 15% cohesive fines (non-granular). The material should contain a wide range of materials sizes to provide shear strength and internal friction which increases load bearing values. The material should have a P.I. between 2 and 10 and a L.L. of 30 max.

As with any new product, Glenn County Public Works staff was initially skeptical of the claims of Perma-zyme, but they soon became believers. Their first application was on a gravel road in the central valley for dust control. This was a rural farming road with heavy trucks hauling produce to market. After treatment, dust was reduced by about 50%. However, a spin-off benefit was a 70% reduction in weeds

Continued, next page

growing into the shoulders. Another benefit in treating unpaved roads with Perma-zyme was the reduction in the frequency of grading of the road - from three times annually to only once a year. Wash-boarding was also reduced. Since 1998, Glenn County has treated over 20 miles of unpaved gravel or dirt roads ranging from valley farm-to-market roads, to timber haul roads at 4,000-foot elevation.



Placing chip seal on Perma-zyme-treated road base

Glenn County has also treated over 30 miles of road base, where a double chip seal surfacing was applied directly onto the treated road base. Perma-zyme treated road base aggregate was placed directly over the aged, deteriorated pavement, and then incorporated into the road structure by pulverizing to a depth of 10" in a process known as Full Depth Reclamation (FDR). Additionally, Perma-zyme treated aggregate base was compacted into the top layer to receive a final double chip seal application. This procedure reduced construction costs by roughly 40% compared to past practices.

Of course, a typical question is: "How long does this treatment last"?

Glenn County Public Works Road Operations

Superintendent, Marty Hansen, has various Perma-zyme treated roads with a double chip seal surface. Marty says, "We have Perma-zyme treated roads that were double chip sealed in early 2000 that are performing fantastic over a dozen years later. These roads are virtually maintenance free. Where a typical double chip seal is expected to last only 7 to 10 years, the enzyme-treated roads continue to show no sign of wear or cracking. The next chip seal surfacing may not be needed for another 10 years!"

There are other stabilizers on the market so how does Perma-zyme treatment compare?

Mr. Hansen says,

"Typical Full Depth Reclamation with a double chip seal surface with other stabilizers costs over \$500,000 per mile. We estimate our costs with Perma-zyme treatment and double chip seal surface at about \$175,000 per mile. With these kinds of savings and long term performance, we are very satisfied with the overall results."

For more information on Perma-zyme visit: www.permazyme.biz or contact Marty Hansen via mhansen@countyofglenn.net.



Survey Results of Agencies and Industry on Impacts of ADA related DOJ/DOT TA By Ding Cheng and Gary Hicks, CP² Center

The Department of Justice (DOJ) and the Department of Transportation (DOT) through the Federal Highway Administration (FHWA) issued a joint Technical Assistance (TA) document in late June 2013, clarifying the definition of various surface treatments as either alteration or maintenance for the purposes of requiring ADA compliant curb ramps. The TA can be found at the following website: http://www.fhwa.dot.gov/civilrights/programs/doj_fhwa_ta.cfm.

Basically, whenever a sidewalk or other pedestrian walkway crosses a curb, it will require the construction of a curb ramp on a pavement alteration project, unless the existing curb ramp meets current standards. This may significantly increase the overall project cost. Micro

surfacing is considered an alteration requiring curb ramps while slurry seals are not. Similarly, while chip and slurry seals are considered "maintenance" which do not require curb ramps, cape seals (the combination of the two) are considered alterations and will require curb ramps.

Working with the Foundation for Pavement Preservation and the California Chip Seal Association, the CP² Center sent out a survey between May 1 and June 1, 2014. The following is the summary of the results with questions.

1. How will this new interpretation affect your ability to maintain your roads?

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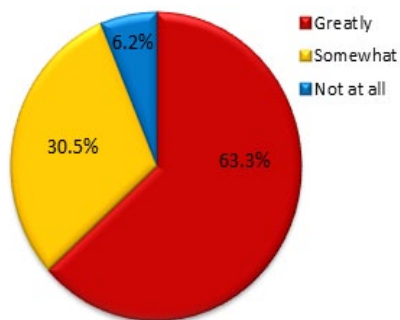


Figure 1.
Answer to
question 1

Figure 1 shows the results of the question 1. More than 63% of the participants believe that the new interpretation of what is considered alteration and what is considered maintenance will greatly impact the ability to maintain their roads.

2. Do you use micro surfacing, cape seals, thin and ultrathin HMA, and in-place recycling to maintain your roads?

A total 257 people answered this question and 233 participants (over 90 % as shown in Figure 2) replied that they use micro surfacing, cape seals, thin and ultrathin HMA, and in-place recycling to maintain their roads.

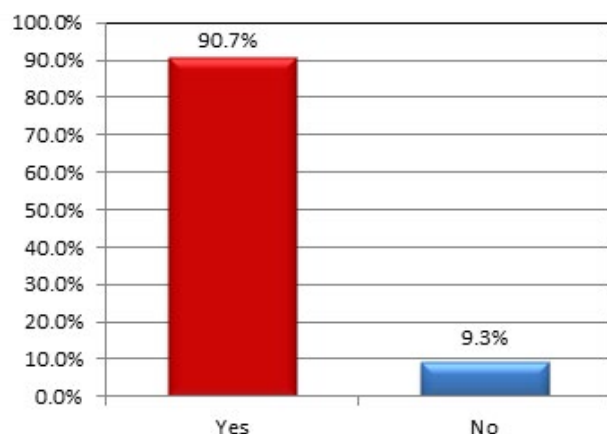


Figure 2.
Answer to
question 2

3. If YES to Question 2, under the new TA, will you no longer choose these treatments that now require the installation of curb ramps where sidewalks are present, even if those treatments are the right treatment for the right road at the right time?

A total 233 participants answered this question and 54% of the participants chose to no longer use those treatments in Question 2 as shown in Figure 3.

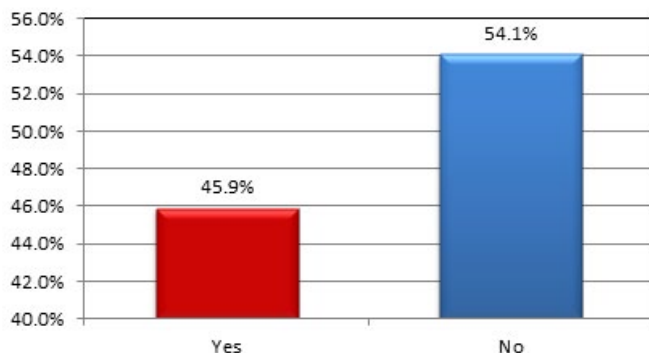


Figure 3.
Answer to
question 3

4. Will this TA document cause you to defer projects on your current plan?

A total 247 participants answered this question and 65% of the participants chose Yes that they would defer projects on their current plan as shown in Figure 4.

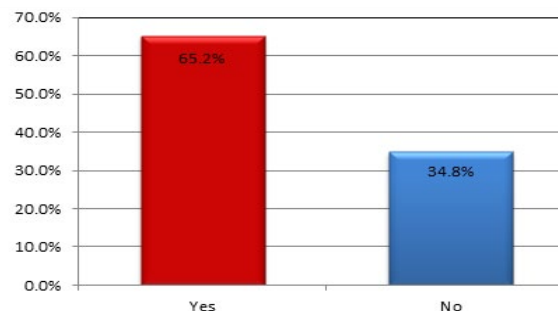


Figure 4. Answer to question 4

5. Will these changes increase the cost of your roads? Please indicate how much it will increase.

A total 222 participants answered this question. 55% of the participants believe that the change will increase the cost of their roads by 20-40%, 34% of the participants believe it will increase by 40-60%, and 11% of participants believe they will see 60-80% increase in terms of the cost of roads as shown in Figure 5.

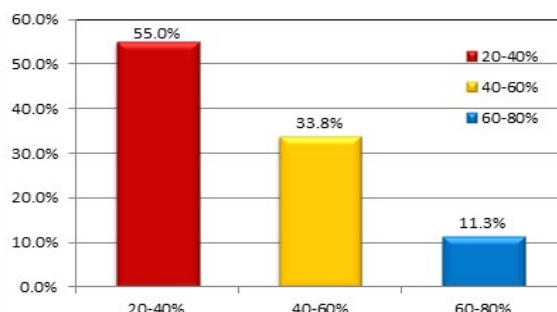


Figure 5. Answer to question 5

6. If no increase is expected, do you believe it will cause you to shift away from treatments that have worked well for you in the past?

A total 203 participants answered this question and nearly 70% of the participants responded that they would shift to other treatments as shown in Figure 6.

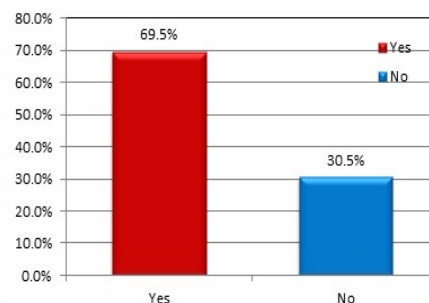


Figure 6. Answer to question 6

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7. Will this new clarification mean you will have to defer maintenance?

A total of 242 participants answered this question and 75% of the participants responded they will have to defer maintenance as shown in Figure 7.

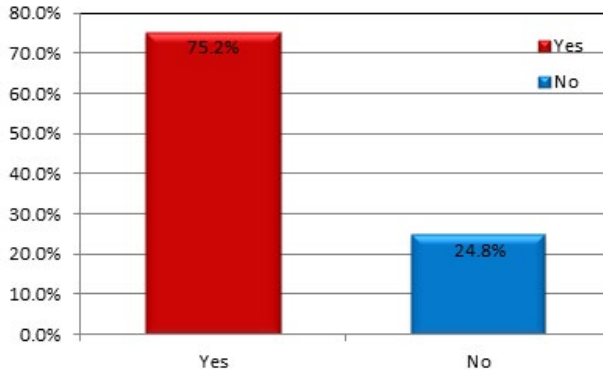
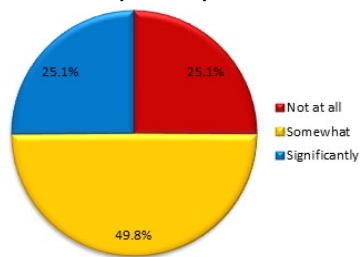


Figure 7.
Answer to
question 7

8. How will this new TA change the way you will contract out work?

A total 243 participants answered this question. As shown in Figure 8, about 50% of the participants answered that this TA will somewhat impact the way they contract work while 25% of the participants answered that it will



have a significant impact on the way they contract out work.

9. Please identify your affiliation related to pavement preservation.

Figure 9 shows that a majority of the participants are from local agency, while 25% are from state or federal agencies. About 11% of the participants are from industry.

Figure 9 shows that a majority of the participants are from local agency, while 25% are from state or federal agencies. About 11% of the participants are from industry.

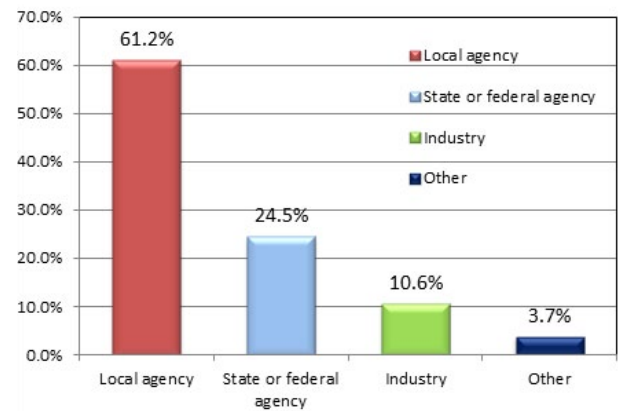


Figure 9. Answer to question 9

In summary, based on the survey results, the following conclusions can be drawn for the majority of the participants:

- The new interpretation of what is considered as alteration and what is considered as maintenance will affect their ability to maintain roads.
- Agencies may no longer use surface treatments, such as micro surfacing, cape seal, or in-place recycling, if they require the installation of curb ramps.
- The TA will cause agencies to defer preservation projects.
- The TA will increase the project costs by 20-40% or more.
- The TA will impact the way Agencies contract out work.

For more information regarding the TA, please contact James Moulthrop of FP² at jimmoulthrop@gmail.com.

These results are based on the survey sent out by the CP² Center. The findings will be updated once CP² Center gets the responses from the FP², Inc. and the CCSA.



2014 Spring CEAC Conference Held in Conjunction with the California Cities' Public Works Institute By R. Gary Hicks, CP² Center

Over 200 people attend the 2014 County Engineers Association of California (CEAC) conference held in Sacramento, March 26-27, 2014. The conference featured presentations on many important topics including:

- The power of "positivity"
- ADA - Everything you wanted to know, but were afraid to ask
- Highway Safety Improvement Program - Making our roads safer

- Leveraging partnerships to create "complete streets" in your community
- A balanced approach to performance strategic management
- Pavement Strategies - Good for the environment and good for the bottom line

The Pavement Strategies session was chaired by Greg Kelley of Los Angeles County, and included speakers Dr. Gary Hicks (CP² Center),

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James Emerson (Pavement Recycling) and Kevin Donnelly (Western Emulsions). Dr. Hicks discussed the role of preservation treatments to save on costs, energy use, and environmental impacts. James Emerson discussed the role of recycling and full depth reclamation in saving costs, energy and reducing emissions. Kevin Donnelly discussed the "Needs Assessment Study" done for the state showing the overall condition of the local agency networks and how preservation and recycling can help stretch the agency dollars.

James Emerson, Kevin Donnelly, Greg Kelley, and Gary Hicks



A major highlight of the meeting was recognizing the winners of the 2014 local streets and roads project awards

to both Cities and Counties. The following were the 6 winners:

- City of Glendale - Central Avenue and Adjacent Streets Improvement Project
- Butte County - Ord Ferry Road Full Depth Reclamation with Cement
- Los Angeles County - Sinaloa Street Pavement Preservation Project
- City of Hayward - Pavement Reconstruction Using Cold In-place Recycling
- Placer County - A Traffic Safety Project for

Local Agencies

- City of Santa Monica - Ocean Park Boulevard Green Street Project

The award winners are shown in the photo below along with the presenters, Scott McGolpin and Keith Cooke, the presidents of the CEAC and LOCC.



Left to right: Scott McGolpin, CEAC president and DPW Santa Barbara County; Scott Hightower, Butte County; Richard Moreland and Stephanie Holloway, Placer county; Lee Swain, City of Santa Monica; Roubik Golanian, City of Glendale; Martin Pastucha, City of Santa Monica; Morad Fakhrai, City of Hayward; Keith Cook, President, League of California Cities and City of San Leandro' Greg Kelley, Los Angeles County

Copies of the presentations and more information on the conference can be found on the CEAC conference website at: <http://www.ce-accounties.org/Conference%20Handouts.aspx>



Fuel Tax Indexing Succeeds In Nevada By Roger Smith, CP² Center

You can't go far in the transportation world these days without hearing about what a mess our funding is in, and that much of the blame goes to the fact that per gallon tax revenues from fuel sales have fallen as vehicles have become more and more efficient. Less driving in general also plays a role, driven by factors such as higher fuel prices, traffic congestion, more telecommuting, social media and transit expansion, to name a few.

So it's simple math: fewer gallons of fuel purchased = less fuel tax revenue for maintaining our streets and highways. While there's been much talk of the need to establish "user fees" based on vehicle miles traveled (VMT), this revolutionary approach seems to be a ways off. But some agencies have moved forward with inno-

vative plans to help minimize the decrease in revenue.

The recent Nevada Transportation Conference in Las Vegas devoted an entire day to the funding and economics of transportation projects, and showcased some innovative approaches now being taken in the Silver State.

The two major population centers of Nevada are Las Vegas and Reno. Each of these areas, through their Regional Transportation Commissions (RTC's), has instituted a program for "indexing" their fuel tax to inflation via the Producer Price Index (PPI) for Street & Highway Construction from the U.S. Department of Labor. They went this direction after realizing that their motor fuel taxes had stayed at a "flat" 52 cents/gallon since

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1995. So while their cost of doing business had increased over the 15-plus years, their fuel tax revenue hadn't even kept up with inflation.

In the Las Vegas area, the RTC of Southern Nevada began their indexing in January of 2014 as a 3-year program. The program included an initial 3.2 cents per gallon increase in 2014, with a projected total increase of 10 cents per gallon through 2016. In fiscal year 2015 indexing revenues are projected to be approximately \$50 million at a rate of 6.6 cents per gallon. Overall, the 3-year plan is expected to provide an additional \$700 million in bonding capacity for transportation improvements. That equates to at least 8000 jobs. The cost per driver will amount to about a "dime-a-day" over the 3-year period. In 2016 voters will decide whether to continue the indexing program.

"As Southern Nevada continues to recover from the economic recession, it is more important than ever that we ensure that we have the transportation infrastructure to accommodate new businesses and economic growth," said Tina Quigley, RTC General Manager. "This begins with smart transportation planning and investment. By investing in our community one gallon at a time through Fuel Revenue Indexing, we will be able to build regionally and locally significant transportation projects, create thousands of jobs and diversify our economy; all benefiting

our more than 2 million residents and 40 million visitors annually. Its economic significance is the reason why the Nevada Legislature, the Clark County Commission and private businesses overwhelmingly supported the initiative."

The Washoe (Reno) area RTC has had similar success with indexing their fuel tax revenues, including local, state and federal taxes. Their program has been in place longer and has resulted in an average of about 30% annual added revenue since its inception in 2010, with a projected yield of \$2.6 billion through 2040.

According to Jeff Hale, P.E., Director of Engineering for the Washoe RTC, "Fuel tax revenues generated from inflation indexing have enabled the RTC to greatly improve the overall condition of the regional network, as well as deliver some important capital projects that wouldn't otherwise have been possible."

A "local" action like fuel revenue indexing isn't the total solution to our funding dilemma, but it can play a very important role in closing the funding shortfall, at least until something like a VMT-based user fee becomes reality. This is all money that will be put to work on local transportation projects using local contractors and suppliers.

For more information on these two regional programs funding success in Nevada go to: www.rtcnv.com/fri or www.rtcwashoe.com



FHWA Update By Steve Healow, FHWA California

Two ominous events will occur in the next few months. The Highway Trust Fund is expected to run dry in August and the current surface transportation law (MAP-21) lapses at midnight on Sept. 30. To address both of these issues the administration sent their proposed surface transportation reauthorization bill, the GROW AMERICA Act, to Congress on April 29th. The bill proposes spending \$199 billion on highways over the next four years, which is 20% above current spending. In addition the bill proposes \$72 billion for transit and \$19 billion for rail programs for a grand total of \$302 billion.

With respect to revenues, our 18.6 cents per gallon gas tax raises \$30 billion per year. The Grow America Act proposes to raise half the necessary revenue, or \$15 billion, from a one-time business tax. The Act is not specific about what type of corporate tax reform is required. Winners as a result of the new bill include pas-

senger and freight intercity rail, public transit, rural roads, large MPOs, intermodal freight programs and projects. Losers would include the businesses that must absorb the one-time tax increase.

The bill is unique in several respects:

- At 350 pages it's the shortest bill since ISTEA in 1991;
- It gives States several new options, e.g. install electronic toll facilities on interstate routes and charging stations for electric vehicles throughout the states, including interstate rest stops;
- It requires the U.S. DOT to find ways to expedite environmental reviews and other permitting processes for new transportation projects.

In other reauthorization news on May 12th the Senate Environment and Public Works Committee circulated a

Continued, next page



proposed a six-year bill which authorizes highway programs at current funding levels, plus inflation. Other Senate committees will add programs for transit and rail. With current Highway Trust Fund projections, even level funding will not be possible without congressional action to keep the trust fund solvent.

Meanwhile the House Transportation and Infrastructure Committee leadership announced they will introduce their proposed legislation in late spring or early summer.

Imagine a grant program which has no deadlines, but rather makes periodic awards to state and local agency applicants throughout the year. Eligible activities include all aspects of highway transportation, i.e. planning, design, construction, operations, materials, pavements, and structures. The grant program was created by Section 1304 'Innovative Project Delivery' of MAP-21. For more info see <http://www.fhwa.dot.gov/accelerating/grants/>

Your input is needed to help shape transportation policy. Any day now a long-awaited Notice of Proposed Rulemaking (NPRM) will appear in the Federal Register. The NPRM is actually a draft regulation mandated by Section 1106 "National Highway Performance Plan" of MAP-

21, wherein "... the Secretary (of Transportation) shall, by regulation and in consultation with State departments of transportation, establish the "process" to develop the State's risk-based asset management plan for the National Highway System (NHS)..." The purpose of the asset management plan is to improve and preserve the condition of the assets and the performance of the system. Two classes of assets (bridges and pavements) are mandatory in the first plan. In addition Caltrans will include culverts and selected IT assets, e.g. traffic signals. The plan will include strategies to make progress toward achieving performance targets for asset condition and performance of the NHS. Following publication of the NPRM there will be a 90-day public comment period. All interested persons, especially state and local governments which own and operate NHS routes, are invited to return comments, particularly with respect to appropriate performance measures and target values. After the comments are considered the final regulations will be published.

For more information contact: Steve Healow, FHWA at: Steve.Healow@dot.gov



Pavement Preservation and Innovation Featured at the Utah Meeting By R. Gary Hicks, CP² Center

Over 550 individuals attended the Utah Asphalt Pavement Association (UAPA) conference in Sandy, Utah, on February 26-27, 2014. Over one-half of the attendees were from local agencies, which was very impressive. In addition, the conference featured over 50 vendors and an equipment show featuring the latest in paving equipment and more.

Keynote speakers included Jeff Holt, the Utah Transportation commissioner, Utah DOT Deputy Director, Shane Marshal, and FHWA Division Administrator for Utah, Ivan Marrero. They discussed the successes of the Department as well as the problems with future funding.

The rest of the conference included four separate tracks including:

- Innovation, design and technology
- Maintenance and preservation
- Construction and engineering
- Industry updates and safety

All of the presentations can be found at the

UAPA website www.utahasphalt.org. The Center was represented by Gary Hicks, who discussed innovations in pavement preservation technologies. The program also featured presentations on most other preservation treatments including discussions on pavement recycling and strategy selection.

Other highlights included the induction of an old friend, Doyt Bolling, into the Utah Asphalt Hall of Fame. Doyt was the second recipient of this Distinguished Award. Dr. Don Brock received the first award in 2013. Doyt retired from FHWA in the 90's and then spent 15 years as the Director of the Utah LTAP program in Logan Utah.



Graniterock Holds Pavement Expo By Shanna McCord Crigger, Graniterock

More than 300 Graniterock customers attended their 14th Annual Pavement EXPO on April 10 at the company's 114-year-old A.R. Wilson Quarry in Aromas, California. The EXPO is a chance for pavement maintenance professionals in both private and public works sectors to get hands-on experience and asphalt product knowledge. The EXPO is set in the heart of the Quarry operation, which allows participants to see up close the source of material production.

Graniterock President and CEO Tom Squeri welcomed the group and shared his insight on California and the country's renewed emphasis on rebuilding road infrastructure.

Sales Manager Don Barrett kept the program on schedule and engaged the audience throughout the day with details on the latest developments and practices in asphalt pavement maintenance products, and aggregate production and uses. The EXPO included a live demonstration by Telfer Oil of the chip and fog seal processes, which also featured Graniterock's road oils and emulsions. Telfer Oil pavement specialists Steve Olsen, Nick Barrett and Cesar Lara shared their experiences with pavement maintenance, the latest products / processes and answered questions from the crowd of field professionals and public works personnel from City and County agencies from San Francisco to Monterey. Their talks included

details on chip seals, cape seals, bonded wearing course, road oils and emulsions.

This year's group had a rare opportunity to see a well-controlled shot blast at the Quarry by Graniterock team members Jeremy Hunzie and J.P. Holcomb. The City of Watsonville was honored with the Graniterock Agency Excellence

Award in recognition of its excellent evaluation, delivery and safety in road maintenance.

Some of the Company's antique vehicles were on display, including a rail-car from the early 1900s, a 1925 roller and a road grader from the 1920s.

Modern equipment such as a cold-in-

place recycling machine and a technologically-advanced oil pot were also on display.

Graniterock has been headquartered in Watsonville, California, since its founding in 1900. The Company's employees work in branch locations in South San Francisco, Redwood City, San Jose, Salinas, Monterey, Oakland, Watsonville, Felton, Cupertino, and Santa Cruz. Graniterock supplies construction materials including ready-mix concrete, hot mix asphalt, building materials, landscaping supplies, rock, sand and gravel.

For more information contact Shanna McCord Crigger at: scrigger@graniterock.com



Blasting at the Graniterock Quarry in Aromas

CCSA Conducts a Pavement Preservation Roundtable in Milpitas, CA By R. Gary Hicks, CP² Center

Nearly 50 people attended the California Chip Seal Association Roundtable in Milpitas on May 29, 2014. Over 10 agencies were represented from the Bay Area in the second year of the roundtables put on by the CCSA to solicit input on issues related to pavement preservation.

Scott Dmytrow, president of CCSA, started the meeting off with the purpose of the round table followed by an overview of pavement preservation in California. Other presentations included:

- Funding Transportation-Scott Metcalf, Ergon

- Changes to aggregate gradations- Don Barrett, Granite Rock
- Emulsions and uses- Rick Best, Reed and Graham
- Hot applied binders-Jason Lampley, Intermountain Slurry Seal

After the short presentations, each of the agencies was asked to provide input on issues dealing pavement preservation within their respective jurisdictions. Some of the issues raised included:

Continued, next page

- Effect of the ADA joint technical assistance issued in 2013 and how it will impact micro-surfacing and cape seals
- More information on longevity of treatments including strategy selection
- Use of multi-layered treatments on bad roads
- Funding issues for local roads
- Problems with chip seals and bikes and with rock loss, including need for engaging the public in chip seal projects. Timing of sweeping and the use of flush coats to prevent rock loss
- Amount of prep work needed for preservation treatments
- Resources available for assistance such as the Maintenance Technical Advisory Guide (MTAG)

Scott Dmytrow,
President of
CCSA
(Telfer Oil)



George Bradley (PMI), Don Barrett (Granite Rock), and Scott Metcalf (Ergon)

The CCSA association said that they and the Center can be a resource for preservation information. For more information, it was suggested to the agencies that they check the websites for the CCSA (www.chipseal.org) and the Center (www.CP2info.org/Center).

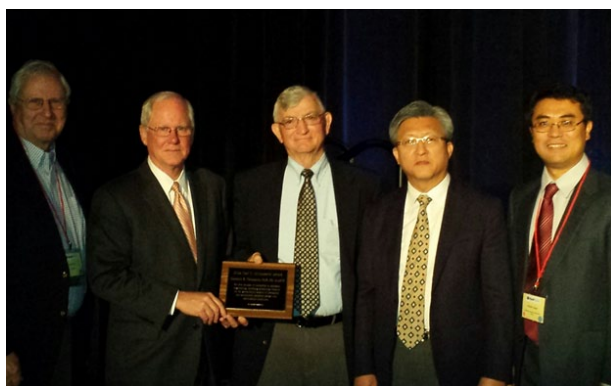
The next roundtable is scheduled at Fullerton CA on June 19, 2014. For more information, please check out the following link <http://origin.library.constantcontact.com/download/get/file/1108936514282-28/South+Pavement+Preservation+Roundtable.pdf>



12th ISAP Conference Successfully Held in Raleigh NC

By Ding Cheng, CP² Center

The 12th International Society of Asphalt Pavement (ISAP) conference was successfully held at the Convention Center of Raleigh, NC between June 1 and 5, 2014. The conference attracted more than 300 attendees from academia, government agencies, industry, and



Gary Hicks, Charles Schwartz, Marshall Thompson, Richard Kim, and Ding Cheng

research institutions from 35 countries. The conference resulted in 229 papers and included 181 podium presentations and 48 poster presentations. The conference provided an excel-

lent platform for asphalt engineers and researchers around the world to exchange their research and practice on asphalt materials and pavements.


There were four excellent plenary presentations at the conference including:

- "M-E Flexible Pavement Design: Issues and Challenges" by Marshall Thompson, University of Illinois
- "Insights into Binder Chemistry, Microstructure, Properties Relationships, Usage in the Real World" by Jean-Pascal Planche, Western Research Institute
- "Acceptance Testing and Variability – Impacts on Construction Operations" by Jon Epps, Texas Transportation Institute
- "Why Preservation – Treatment Types, Benefits, and Challenges" by R. Gary Hicks, California Pavement Preservation Center

Dr. Thompson received the third Monismith Lecture Award by ASCE Geo-Institute Pavement Committee.

Continued, next page

Pavement preservation has become more and more important in asphalt pavements. The Conference featured one plenary session and two technical sessions on the pavement preservation. Ding Cheng gave a presentation on "Performance Study of Fog or Rejuvenating Seals on Gap and Open Graded Surfaces for Caltrans". The paper was co-authored by Lerosé Lane of

CP² Center, and Peter Vacura of Caltrans. For more information about the 12th ISAP Conference can be found from the following website located at <http://www.ncsu.edu/mckimmon/cpe/opd/ISAP/>. The 2016 ISAP Symposium will be held in Jackson Hole, Wyoming and will be managed by the Western Research Institute. 



CP² Center Participates In 2014 CalRecycle Conference

By R. Gary Hicks, CP² Center


Over 100 participants attended the 2014 Tire Conference held on April 23-24, 2014 in Sacramento, California. The 2-day conference covered topics including:

- California Waste Tire market Update
- Update on CalRecycle's Enforcement Effort
- CalRecycle Tire Grant Opportunities and Updates
- Developing New Tire-Derived Products
- Green Roads
- Update on CalRecycle Outreach to Customers and Opportunities for Industry Collaboration

The Session on Green Roads featured speakers discussing the work being done by/for CalRecycle on Tire Derived Aggregate (TDA) and Rubberized Asphalt Concrete (RAC). The TDA session included presentations by Stacey Patenaude (CalRecycle) and Joaquin Wright (consultant to CalRecycle). They described the ongoing work related to using TDA in Civil Engineering applications. The RAC session included presentations by Nate Gauff (CalRecycle) and Theron Roschen (Consultant to CalRecycle) on the programs related to RAC. Drs. Ding



Gary Hicks at 2014 CalRecycle Conference

Cheng and Gary Hicks, of the CP² Center, wrapped up the session describing some of the work they have done for CalRecycle on using warm mix additives with RAC, cost effectiveness of RAC, and the development of performance models for RAC materials for use in pavement management systems used in the state of California. The overall theme of the session was to show the benefits and growth of these products used in California. All the presentations from the conference can be found at the conference website at <http://www.cce.csus.edu/conferences/CalRecycle/tw14/index.cfm?pid=668>. 

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 are some recent news regarding to the Center.

Ding Cheng Was Promoted to Full Professor

Dr. Ding Cheng was rated as excellent on teaching, research, and service by the College review committee and Dean Ben Juliano of the College of Engineering. He was promoted to a full professor from a tenured associate professor.

Caltrans Renewed the CP² Center Contract

Caltrans continued its support on pavement preservation effort. The \$1.5 million new contract has the following four major tasks:

- Provide technical assistance on pavement preservation issues
- Investigate new and innovative technologies in pavement preservation
- Promote effective pavement preservation
- Provide training and education on pavement preservation

The CP² Center also has two subcontractors, Cal Poly San Luis Obispo and CSU Long Beach, to support this contract effort.

CalRecycle Funded the TDA Technology Center and Civil Engineering Material Testing

CalRecycle continues to lead the effort to use waste tires in civil engineering applications. This new contract features assisting CalRecycle in increasing the use of the TDA in civil engineering applications. TDA Tech Center will provide support to both private engineers and public agencies to gain acceptance of TDA as a viable civil engineering construction material and thereby create more opportunities for TDA projects.

The material testing services aspect of the contract will be supporting CalRecycle and local agencies by investigating and testing the engineering properties of TDA and rubberized asphalt concrete (RAC) to ensure the successful usage of the waste tires in civil engineering applications.



Rene Robinett with Brennen Urbanek (left) and Nica Ceja (right)

CP² Center was certified again by Caltrans

The Center's lab was certified again by Caltrans. Caltrans Rene Robinett gave exams to the Center's technicians. A total of six people were certified including Ding Cheng, Brandon Fraser, Brennen Urbanek, Nica Ceja, Xai Lao, and Andrew Montague.



Patrons Program Supports CP² Center By R. G. Hicks, CP² Center

Background

The CP² Center was established in 2006 at CSU Chico to provide assistance with the development and use of appropriate pavement preservation strategies. The Center was originally funded by Caltrans and continues to work closely with them, as well as other agencies. We maintain a very experienced staff of pavement experts, and a state-of-the-art asphalt lab facility.

But the Center is funded only by contracts with agencies such as Caltrans and CalRecycle and other clients, and work under those contracts is narrowly defined so that funding may only be used for specific contract tasks. The Center, therefore, has no contingency funding to sustain "overhead" activities such as:

- maintaining lab equipment,
- preparing contract proposals,
- organizing meetings and conferences,
- participating in events to promote pavement preservation, and
- delivering training classes
- support for the Center's newsletter

This funding must come from non-contract sources such as our Patrons.

Benefits

Patron supporters of the CP² Center can benefit from:

- general promotion of pavement preservation concepts
- increased market for pavement preservation products and services
- training programs in of pavement preservation technology
- assistance with research, both lab and field
- availability of a credible "3rd party" for technical expertise, and
- participation in special meetings and conferences.
- access to our students

We will be continuing to expand our Patrons group during 2014.

For more information on how to join our Patrons group and the benefits of joining, please contact Co-Chairs, Dr. Gary Hicks at rg Hicks@csuchico.edu and/or Dr. Hans Ho at hansho@telfercompanies.com. More information on the Patrons program can be found on the Center's website at: www.cp2infor.org/Center.





Mark Your Calendar (Coming Events)

Petersen Asphalt Conference, July 14-17, 2014 (Laramie, WY)

The Petersen Asphalt Research Conference brings together top researchers, highway officials, producers and others who are working to advance the specification and performance of petroleum asphalts. For 50 years, research presented and discussed at the Petersen Asphalt Research Conference has led to safer, longer-lasting and more cost-effective highways throughout the world. The Pavement Performance Prediction Symposium on July 17 allows conference participants to dedicate one more day to a single key aspect of pavement performance.

For more information go to: <http://www.petersen-asphaltconference.org/>

Geohubei International Conference, July 20-22, 2014 (Hubei, China)

Sustainable Civil Infrastructures: Innovative Technologies and Materials

This Sustainable Civil Infrastructures using Innovative Technologies and Material is endorsed by a number of leading international professional organizations.

One of the main objectives of the transportation authorities is to provide safe transportation facilities for effective and efficient movement of people and goods. This conference will provide a showcase for recent developments and advancements in design, construction, and safety inspections of transportation infrastructures and offer a forum to discuss and debate future directions for the 21st century. Conference topics cover a broad array of contemporary issues for professionals involved in bridge, pavement, geotechnical, tunnel, railway and emerging techniques for safety inspections. You will have the opportunity to meet colleagues from all over the world for technical, scientific, and commercial discussions.

For more information visit: <http://geohubei2014.geoconf.org/>

County Engineers Association of California (CEAC) Bedroll Conference July 23-25, 2014 (Lake Almanor, Plumas County)

The 33rd Annual Northern California Bedroll Conference will be held at Lake Almanor in Plumas County. This Tri-Regional Northern California, Sacramento Motherlode and Bay Area (now combined) CEAC meeting brings together Public Works Directors, our partner agencies, and senior staff from the three regions in an informal atmosphere to discuss new and challenging aspects public agency engineers face today. For more information please contact stevem@quincygeng.com, or visit http://www.ceaccounties.org/Bedroll_2013.aspx

Pavement Resurfacing Workshop, June 25, 2014 (El Dorado Hills, California)

This workshop welcomes TRB Concrete Pavement Dual Committee members and DOT experts from around the nation to join an interactive and ground-breaking seminar.

The workshop is sponsored by El Dorado County Transportation Commission, City of Elk Grove, California Nevada Cement Association (CNCA), Southwest Concrete Pavement Association (SWCPA), and National Concrete Pavement Technology Center (NCPTC). The topics include:

- Featuring Full-Depth Reclamation (FDR).
- Concrete Overlays.
- Recycle roads and streets in-place.
- Build cost-effective concrete overlays for resurfacing.
- Save money in maintenance budgets.
- Evaluate overlay performance.
- Utilize concrete and asphalt to your best advantage.

John Donahue, P.E., Vice Chair of AASHTO Joint Technical Committee on Pavements, and Don Greb, P.E., Principal Engineer at Griffin Soil are featured speakers at this seminar. For more information or to RSVP use the following email: paulette.salisbury@cncement.org

This newsletter was produced in partnership with Caltrans. 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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