



CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

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CalAPA Fall Conference

By Roger Smith, CP2 Center

The California Asphalt Pavement Association's (CalAPA) Fall Conference and Equipment Show was held October 29 & 30 in Sacramento. The 240 attendees were welcomed by CalAPA



CalAPA staff (L to R), Tony Grasso, Sophie You and Russell Snyder

Executive Director, Russell Snyder. They browsed product and equipment displays and enjoyed presentations on timely issues affecting the world of asphalt pavements.

Here are some of the presentation highlights:

- **Environmental Safety & Health.** Dr. Howard Marks (NAPA) presented an overview of national issues such as crystalline silica dust from pavement milling, greenhouse gas emissions from HMA, and MSDS requirements. He noted that environmentally-friendly warm mix asphalt (WMA) now accounts for about 1/3 of U.S. asphalt mix production. With mounting community resistance to asphalt plants, often based on misinformation, NAPA now offers support for countering community activism on their website.
- **Funding.** A panel discussion moderated by Will Kempton of Transportation California, tackled the hot topic of future funding for roads in California. It was noted that there doesn't seem to be much political will in Sacramento to fund road work and that we really need "champions" at the state legislative level. The role of self-help counties in providing local funding through sales tax increases was seen as a continuing partial solution to the problem. So far about 20 of the 58 California counties have benefited from these initiatives, and they currently

provide about 60% of the overall funding in California. All eyes seem to be on a vehicle miles traveled (VMT) tax to replace the dwindling fuel tax 'at the pump' as a major source of transportation funding.

- **Quieter Pavements.** Randy Iwasaki of the Contra Costa Transportation Authority gave an overview of the latest thinking on quieter pavement surfaces. Thin open graded friction courses (OGFC), long popular with Caltrans for wet weather safety, still seem to offer the best reduction of tire noise. Using a rubberized asphalt binder in these OGFC mixes helps improve their long-term abil-

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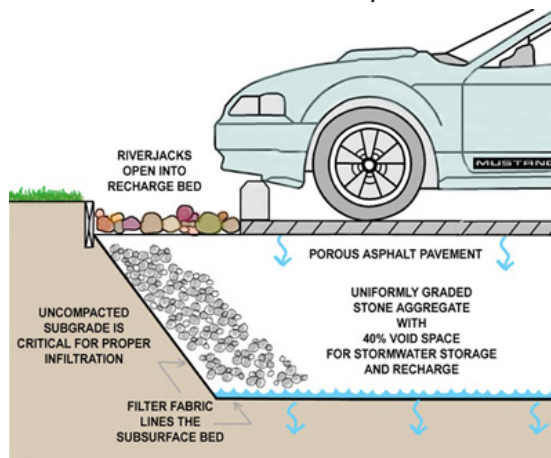
ity to reduce noise and their overall longevity. Noise reductions of 5 dBA are not uncommon using these surfacings, which might even avoid the need for a sound wall.

- **Caltrans Superpave / "Section 39" Update.** In an effort to move further into full Superpave asphalt mix technology, Caltrans is rewriting Section 39 for its new 2015 Standard Specifications. Toni Carroll of Vulcan Materials noted the following highlights:
 - The QC/QA process with pay bonuses will go away.
 - Asphalt content will now be specified by "total weight of mix" (not by dry weight of aggregate)
 - Aggregate gradations are somewhat coarser resulting in lower asphalt contents
 - Only Type A mixes will be offered in Section 39 (no Type B)
 - Coarse aggregate must have 2 fractured faces on 90%
 - RAP will be allowed up to 25% in surface courses
 - Mix design will require a gyratory compactor and Hamburg Wheel Track tester (no more Hveem Method equipment)
 - HMA can be sampled at various locations (truck bed with an auto-sampler, from the windrow or behind the paver)
 - Training for the new Section 39 is planned for Spring 2015

It will be important for Local Agencies to not simply specify Section 39 for their HMA paving. Since there are many sampling and testing requirements that go along with the new Section 39 specification, it's likely an expensive overkill for most local, lighter traffic projects. A committee is working on an HMA specification for lower volume roads, which will provide a mix much like the old Caltrans Type B.

- **RAP & RAS.** The use of reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS) in HMA is becoming more and more popular. Gerry Huber of Heritage Environmental Research presented an overview of the state of the art and noted that generally 25% binder replacement is a practical maximum. Greater percentages require special testing and adjustments to asphalt binder grade or special additives. He noted that in countries like Holland and Japan, 50% RAP is commonplace and sometimes actually required. On the cautionary side, he noted that FHWA is concerned that there may be a pattern of increased cracking in newer high-RAP pavements nationally, possibly due to the higher RAP percentages. They are spearheading additional research and pavement test sections.

- **Porous Pavement.** As storm water regulations and permitting become more stringent, the role of porous (permeable) pavement, which minimizes pavement run-off, will only increase. Dr. Rita Leahy, CalAPA Technical Consultant, presented an overview of this pavement technology, and pointed out that these pavements require special design elements – usually a 2 to 6-inch OGFC surface layer over a thick



"reservoir layer" of coarse crushed aggregate with about 40% voids. The native soil must also have the proper infiltration rate. By using this technology the cost of positive drainage systems and holding ponds can often be eliminated. Caltrans now has guidelines for use in off-roadway applications (e.g. park-n-ride lots). More information on porous pavement can be found on the CalAPA website: www.calapa.net

- **Pavement Smoothness.** Steve Marvin of LaBelle-Marvin, Inc. reviewed the topic of pavement smoothness and noted the ongoing transition by Caltrans from the old Profilograph to the newer high-tech

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Inertial Profilers, which can capture smoothness at highway speeds. Caltrans has set up a calibration program for these machines used in California. The new descriptor for smoothness is the International Roughness Index (IRI) expressed in terms of inches / mile of pavement roughness.

- **Partnering.** Caltrans likes partnering and has recognized many benefits from it. That's the message put forth by Mark Leja, Chief of the Caltrans Division of Construction. In projects studies since 2011, Caltrans has realized over \$100 million in savings, greatly reduced construction



Inertial profile vehicle on display at CalAPA Conference

disputes and claims, had fewer accidents and has seen better job satisfaction on the part of employees. The contractor perspective is also very positive, reported Mike Ghilotti of Ghilotti Brothers Construction. Benefits include better communication lines with owners, smoother projects, fewer delays and claims, and quicker, more reasonable settlement of issues. More than 4000 people have received training in partnering by Caltrans since 2009.

Copies of all the presentations from the Conference are posted on the CalAPA website at: <http://www.slideshare.net/CaliforniaAsphalt/>

These industry-agency conferences are a valuable opportunity to interact with others, to hear the latest industry issues, and to see displays of equipment and products. Be sure to mark your calendar for the next big CalAPA event, the Spring Conference, April 15-16 in Ontario. For more information go to: www.calapa.net



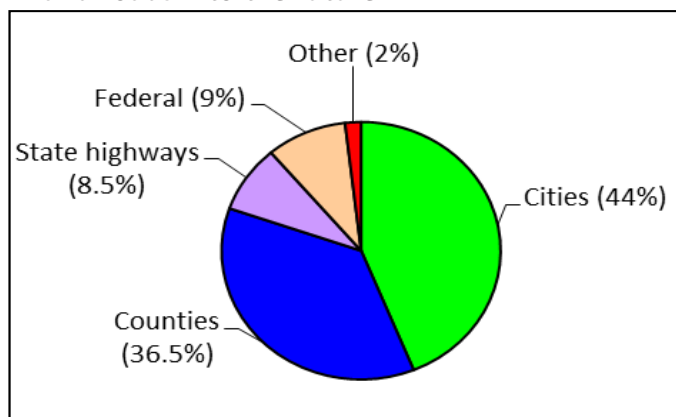
California Local Streets and Roads in Crisis

By Margot Yapp, Nichols Consulting Engineers (NCE)

The 2014 California Local Street and Road Needs Assessment is complete, and the results were not unexpected. Due to an aging infrastructure, rising construction costs and budget constraints, the state's local road network is falling into disrepair at an alarming rate. With heavier vehicles, increasing traffic and the need to accommodate alternative modes of transportation, the demands on California's streets and roads are growing. At the same time, a growing percentage of streets and roads are in poor condition and in need of repair.

The objective of the biennially conducted needs assessment is to report the condition of the local system, provide the overall funding picture for California's local street and road transportation network and to answer some important questions about maintaining this vital piece of the state's transportation infrastructure. What will it cost to bring the street and road network into a state of good repair? What are the needs for the essential components to a functioning system? How much is

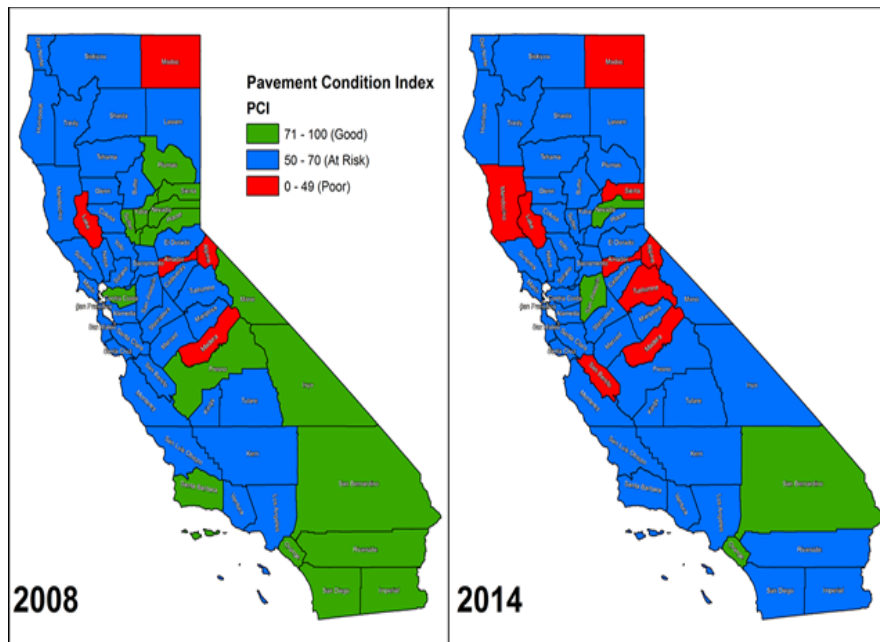
the funding shortfall? What are the solutions? Local agencies hope to use the findings of this report to continue to educate policymakers at all levels of government about the infrastructure investments needed to provide California with a seamless, multi-modal transportation system. It also provides the rationale for the most effective and efficient investment of public funds, potentially saving taxpayers from paying significantly more to fix local streets and roads into the future.



Breakdown of Road Centerline Miles by Agency

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This update surveyed all of California's 58 counties and 482 cities in 2014, and the information collected captured data from more than 99 percent of the state's local streets and roads. This level of participation exemplifies the interest at the local level to provide comprehensive and defensible data in hopes of tackling this growing problem.



Pavements

The results show that California's local streets and roads are moving ever closer to the edge of a cliff. On a scale of zero (failed) to 100 (excellent), the statewide average pavement condition index (PCI) has deteriorated to 66 ("at risk" category) in 2014. Even more alarming, 54 counties are either at risk or have poor pavements (the maps below illustrate the pavement deterioration that has resulted in each county since 2008.) If current funding remains the same, the statewide condition is projected to deteriorate to a PCI of 55 by 2024. The unfunded backlog will increase from \$40 billion to \$61 billion.

It is more cost-effective to preserve and maintain our roads in good condition than to let them deteriorate, since deteriorated roads are more expensive to repair in the future. Consistent with that approach, the costs developed in this study are based on achieving a roadway pavement condition of what the industry calls Best Management Practices (BMPs). This condition represents improving the pavement condition to a level where roads are most cost effective to maintain, requiring pri-

marily preventive maintenance treatments.

Three funding scenarios were investigated to determine the impacts that different funding levels would have on the condition of the roads and the level of improvement that could be achieved in ten years.

They were as follows:

- **Existing funding levels of \$1.657 billion/year** – this is the current funding level available to cities and counties.
- **Funding to maintain existing conditions (\$3.228 billion/year)** – this is the funding level required to maintain the pavement conditions at its current PCI of 66.
- **Funding required to achieve best management practices (\$7.275 billion/year)** – the optimal scenario is to bring all pavements into a state of good repair so that best management practices can prevail. After this, it will only require \$2.4 billion a year to maintain the pavements at that level.

Two key performance measures (PCI and percent of pavements in both good and failed condition) were used to evaluate the impacts of each scenario and the results are summarized in the table below:

Scenarios	Annual Budget (\$B)	PCI in 2024	Condition Category	% Pavements in Failed Condition	% Pavements in Good Condition
Current Conditions	-	66	At Risk	6.2%	56.5%
1. Existing Funding	\$ 1.657	55	At Risk	24.5%	52.0%
2. Maintain PCI = 66	\$ 3.328	66	At Risk	19.9%	77.3%
3. Best Mgmt Practices	\$ 7.275	84	Excellent	0.0%	100.0%

Safety and Traffic Components

The transportation network also includes essential safety and traffic components such as curb ramps, sidewalks, storm drains, streetlights and signals. These components require \$31 billion over the next 10 years, and an estimated shortfall of \$20.9 billion.

Bridges

Local bridges are also an integral part of the local streets and roads infrastructure. There are 11,863 local bridges, and approximately \$4.3 billion is needed to replace or rehabilitate them. There is an estimated shortfall of \$1.3 billion.

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Total Funding Shortfall

The table below shows the total funding shortfall of \$78.3 billion over the next 10 years. For comparison, the results from the previous updates are also included.

Transportation Asset	Needs (\$B)			2014		
	2008	2010	2012	Needs	Funding	Shortfall
Pavement	\$ 67.6	\$ 70.5	\$ 72.4	\$ 72.7	\$ 16.6	\$ (56.1)
Essential Components	\$ 32.1	\$ 29.0	\$ 30.5	\$ 31.0	\$ 10.1	\$ (20.9)
Bridges	-	\$ 3.3	\$ 4.3	\$ 4.3	\$ 3.0	\$ (1.3)
Totals	\$ 99.7	\$ 102.8	\$ 107.2	\$ 108.0	\$ 29.7	\$ (78.3)

What are the Solutions?

To bring the state's local street and road system to a best management practice level where the taxpayer's money can be spent cost effectively, we need approximately \$56.1 billion of additional funding for pavements alone and a total of \$78.3 billion for a functioning transportation system over the next 10 years.

The sooner this is accomplished, the less funding will be required in the future (only \$2.4 billion/year will be needed to maintain the pavements after that.)

To bring the local system back into a cost-effective condition, thereby preserving the public's \$188 billion pavement investment and stopping further costly deterioration, \$7.8 billion annually in new funds are needed to stop the further decline and deterioration of the local street and road system. This is equivalent to a 54-cent per gallon gas tax increase.

The conclusions from this study are inescapable. Given existing funding levels available to cities and counties for maintaining the local system, California's local streets and roads will continue to deteriorate rapidly within the next 10 years. Unless this condition is addressed, costs to maintain the local system will only continue to grow, while the quality of California's local transportation network deteriorates.

To download the full report and read more about how local agencies are working to overcome funding challenges, please visit www.savecalifornias-treets.org



Maintenance Superintendents Association (MSA) Conference & Equipment Show, A Hit By Roger Smith, CP² Center

Over 200 people turned out for the Maintenance Superintendents Association (MSA) Conference & Equipment Show, September 29 to October 3, at the Double Tree Hotel in Sacramento. Among the many training classes offered, several pavement topics were covered. Roger Smith of CP2C gave a

2-hour class titled "Asphalt 101" focusing on hot mix asphalt (HMA) materials and paving. The class was sponsored by CalAPA. Scott Dmytrow represented the CCSA with a talk titled "The Economics of Pavement

Preservation". Jason Lampley of Intermountain Slurry Seal, Inc., presented best practices overview for chip sealing, and Tim Edwards of Crafcro talked on crack sealing equipment and methods.

Formal training for Playground Safety Inspectors, Storm Water Management and Traffic Control and Flagging was also available. Since MSA is also made up of many vendors of equipment and services, the equipment show is always a big part of this annual event.

Congratulations to Chairman Lyle Waite (City of West Sacramento) and Co-Chair Jerry Dankbar (City of Roseville) and the North Central Valley /Sacramento MSA Chapter for hosting a very successful event.

The 2015 Conference and Equipment Show will be held in San Diego September 28 to October 2. MSA has 10 regional chapters in California, 2 chapters in Nevada and one in Arizona. For more information go to: www.mainsupt.com



Roger Smith (CP2C) and Joe Romer (Pavement Consultant) talk pavement

Caltrans Constructs Additional Asphalt Rubber Pilot Chip Seal Test Sections

By Lerose Lane and Ding Cheng, CP² Center, and Haiping Zhou, Caltrans

Since the first rubber modified binder chip seal pilot project was constructed in District 2, Tehama County, on State Route (SR) 36 last year (see details in the September 2013 CP² Center newsletter), Caltrans has constructed two more pilot projects; one in District 2, Shasta County, on SR 44, in a high mountain region near Mount Lassen, and the other in District 8, San Bernardino County, on SR 95, in the high desert region of the Mojave Valley. These projects were initiated by Lance Brown, District 2 Maintenance Engineer, and Mike Ristic, District 8 Maintenance Engineer.

The binders used in these two pilot projects included asphalt rubber (AR) Type II that contains asphalt binder, asphalt modifier, scrap tire rubber, and high natural rubber; AR Type I that contains asphalt binder and scrap tire crumb rubber, and crumb rubber R18 modified binder (CRR18MB) that contains asphalt binder and a minimum of 18% crumb rubber and meets the PG 76-22 R specifications. The pilot projects also included test sections using binders with warm mix asphalt (WMA) additives.



Like the first pilot project, these additional test sites will help Caltrans evaluate the performance characteristics of AR (both Type I and Type II) and CRR18MB. All three binders were placed with and without WMA additives. The performance expectations are that uniform applications at

normal high temperatures and then at lower temperatures after WMA additives are applied will yield similar results. The pilot projects also evaluate the

aggregate retention, aggregate embedment, raveling and resistance to reflective cracking.

Table 1 summarizes the two projects completed in 2014.

Table 1. Summary for Projects

	District 2, SR 44	District 8, SR 95
Maintenance Engineer	Lance Brown	Mike Ristic
Resident Engineer	Jeff Blaine	Godwin Emuh
Prime Contractor	Northwest Paving, Inc.	VSSI, Inc.
Base Binder Grade	Paramount Petroleum PG 64-16	Paramount Petroleum PG 70-10
AR (Type I and II) with and without WMA	VSSI, Inc.	VSSI, Inc.
WMA Additive for AR (Type I and II)	SonneWarmix® CA by Sonneborn	SonneWarmix® CA by Sonneborn
CRR18MB with and without WMA	Paramount Petroleum	Paramount Petroleum
WMA Additive for CRR18MB	Sasobit	Sasobit
Consultant Laboratory	Trinity Engineering Laboratories, Inc.	Trinity Engineering Laboratories, Inc.
Binder Testing	Caltrans, CP ² Center, and APART (for Trinity)	Caltrans, CP ² Center, and APART (for Trinity)
Climate Region	High Mountain	High Desert
Initial Pavement Condition	Good	Poor
Seal Coat Completion Date	9/5/2014	10/4/2014

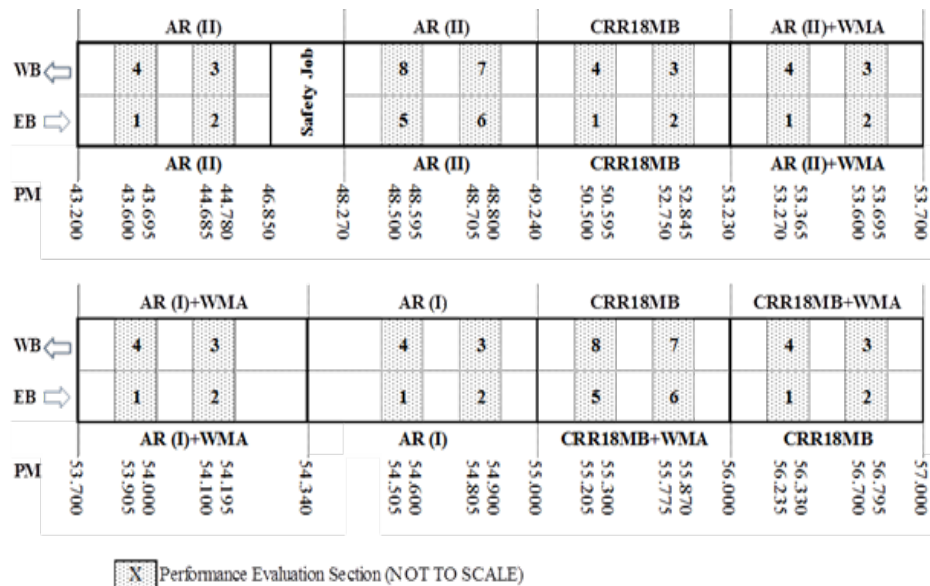
Representatives from industry were on site to observe the placement of several materials for both projects.

Test Section Layout

Both the SR 44 and the SR 99 projects include multiple test sections, and within each test section, four Performance

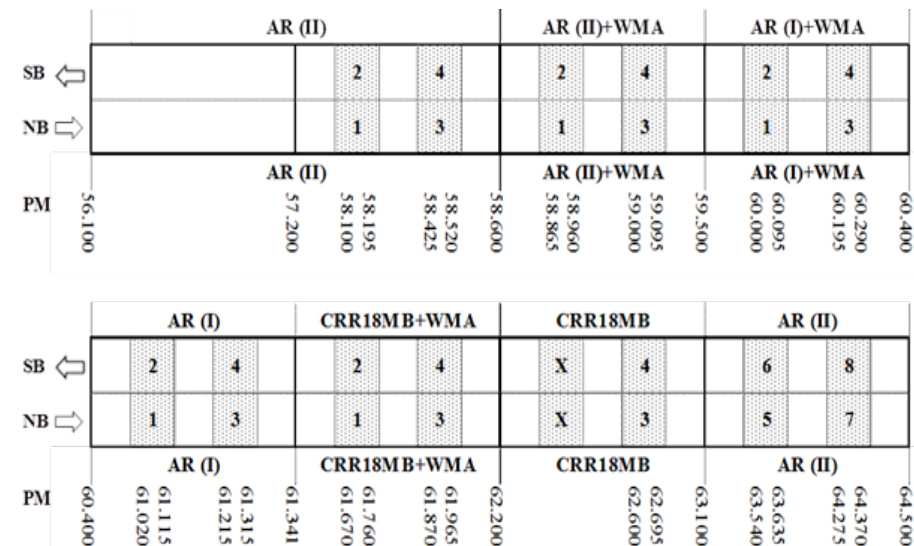
Evaluation Sections (PESs), with post miles as shown, were established for performance monitoring. Most of the PESs were 500 feet long, and are shown in Figure 1a and Figure 1b. Some PESs for the SR 95 project were shortened due to necessary digouts. For both projects, the condition of each PES section was evaluated by the CP² Center prior to the seal coat applications.





AR (II) = Asphalt rubber Type II
 AR (II)+WMA = Asphalt rubber Type II with WMA additives
 AR (I) = Asphalt rubber Type I
 AR (I)+WMA = Asphalt rubber Type I with WMA additives
 CRR18MB = Crumb rubber R18 modified binder
 CRR18MB+WMA = Crumb rubber R18 modified binder with WMA additives

Figure 1a. Layout of the SR 44 Chip Seal Test Sections



Note: 1. Same Legend as Figure 1a
 2. PESs are not in digout areas on SR 95

Figure 1b. Layout of the SR 95 Chip Seal Test Sections

Asphalt Rubber Type II Test Section

Application of the SR 44 AR Type II test section started in the afternoon of August 25 and was completed on August 27. The target spread rate was 0.58 gal/yd² and temperature of the binder was about 400 °F.

Application of the SR 95 AR Type II test section started on the morning of October 1st, 2014.

The binder application rates of 0.57 gal/yd² to 0.58 gal/yd² were used. The application temperature for the binder was between 381 °F and 400 °F. Figure 2 shows the application of AR Type II.



Figure 2. AR Type II Being Applied (SR 95)

Asphalt Rubber Type II with WMA Test Section

Application of the SR 44 AR Type II with WMA test section was done on August 27. SonneWarmix® CA WMA was used. The binder spread rate was targeting at 0.58 gal/yd². The binder application temperature was around 375 °F. A sniffer, installed at the back of the distribution truck over the spreader bar, is required by most counties to reduce smoke and was used for all of the AR Type I and II paving on both of these projects.

Application of the SR 95 AR Type II test section with WMA was done on the morning of October 3rd. The WMA additive was SonneWarmix® CA by Sonneborn. The binder spread rate was 0.58 to 0.61 gal/yd². The binder application temperatures were close to 370 °F.

Asphalt Rubber Type I Test Section

Application of the SR 44 AR Type I test section was performed on August 27. The binder spread rate was targeting at 0.56 gal/yd². The binder application temperature was around 403 °F. Figure 3 shows the application of AR Type I.



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Figure 3. AR Type I application at 403 °F (SR 44)



Application of the SR 95 AR Type I test section was performed on October 4th. The binder spread rate was targeting at 0.58 gal/yd². The binder application temperature was around 385 to 395 °F. Figure 4 shows the application of AR Type I.

Figure 4. AR Type I near PM 61.1 (SR 95)



Asphalt Rubber Type I with WMA Test Section

Application of the SR 44 AR Type I with WMA test section was done in the afternoon of August 27. The target spread rate was 0.58 gal/yd² and temperature of the binder was 375 °F, but was raised to 385 °F due to uneven application at the lower temperature.

Figure 5. AR Type I with WMA being applied at 385°F near PM 60.1 (SR 95)



Application of the SR 95 AR Type I with WMA test section was completed in the afternoon of October 4. The target spread rate was 0.62 gal/yd² and temperature of the binder was about 380 °F. Figure 5 shows the application of AR Type I with WMA at 385 °F and also shows a noticeable decrease of smoke.

CCRR18MB Test Section

Application of the SR44 CRR18MB test section was completed at noon on September 5, 2014. Figure 6 shows the typical application of the CRR18MB binder. The target spread rates were 0.45 to 0.47 gal/yd² and temperature of the binder was about 375 °F.



Figure 6. CRR18MB without WMA (SR 44)

CCRR18MB with WMA Test Section

The SR 44 CRR18MB with WMA test section application was done on the afternoon of September 5. The WMA additive was Sasobit GTRM 850 produced by Sasol Wax North America. The binder spread rate was 0.45 gal/ yd². The binder application temperatures were 355 °F.

The SR 95 CRR18MB with WMA test section application was completed in the afternoon of October 2. Figure 7 shows the typical application of the CRR18MB binder with WMA.

The WMA was Sasobit at 1% of the weight of the binder. The spread rates were 0.45 and 0.50 gal/yd² and temperature of the binder was about 350 °F.





Figure 7. CRR18MB with WMA being applied at 350 °F near PM 60.1(SR 95)

Field and Laboratory Tests and Construction Reports

As part of these pilot projects, a modified field Vialit test was performed to evaluate chip retention and adhesion, and a modified CT 339 was performed to evaluate field binder application rates. Laboratory testing was conducted by Trinity Engineering Laboratories, Inc., the CP² Center, APART and Caltrans to determine various properties of the binders used on these pilot projects.



Figure 8. SR 95 on November 14, 2014

CP² Center is currently developing detailed construction reports for these two projects.



Caltrans & Industry Work Jointly on Specifications

By Roger Smith, CP²Center

There are numerous joint Caltrans-Industry committees and task groups working to create or revise specifications to stay abreast of changes and innovations in HMA technology. Here is an update on the work of some of these important groups.

Section 39 (Superpave) Specification

A Caltrans/Industry Rock Products Committee (RPC) Subtask Group is continuing work on updating Section 39 (Hot Mix Asphalt) of the Standard Specifications. This revision will require mix design via the Superpave process involving a laboratory gyratory compactor and Hamburg Wheel Track (HWT) testing machine. Using data gathered from the Superpave pilot projects, the group was successful in working through the vast majority of the initial concerns identified by Caltrans and Industry.

Some of the outstanding items being worked on are: 1) HWT test variability, 2) maximum virgin aggregate temperature when producing HMA containing RAP, 3) revising the windrow



Hamburg Wheel Track (HWT) test specimens (after testing)

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and compaction temperature requirements that would allow the use of warm mix asphalt (WMA) and 4) the requirement for HWT testing on plant-produced material for mix verification. It's intended that the revised Section 39 will be included in the new 2015 Standard Specifications. For more information contact: Tony Limas at: tony.limas@gcinc.com

HMA Specification for Low Volume Roads

Prior to Caltrans' recent implementation of Superpave via a new Section 39 of their Standard Specifications, the old Section 39 included a Type B hot mix asphalt (HMA). This Type B HMA imposed less stringent criteria for Hveem stability, percent crushed aggregate faces and Los Angeles rattler. Aggregate gradations, however, were the same for both HMA Type A and HMA Type B. The Type B mix was intended primarily for use on very low traffic roads or by cities and counties when utilizing the State specifications. With the implementation of Superpave, Caltrans has eliminated the Type B mix from the standard specifications. But many local agencies (cities and counties) routinely refer to Caltrans specifications, and historically have used the Type B HMA specification for low traffic applications. On these roadways the new Section 39 (Superpave) HMA requirements might not be warranted. Accordingly, a subtask group was formed to create an HMA specification that integrates the Superpave concepts into a new "Type B" HMA specification that addresses the needs of local agencies, by relaxing material quality requirements, and the requirements for materials testing - by both the contractor and the agency. Of course agencies may still opt to use the standard Caltrans Section 39 (Superpave) specification for their more heavily trafficked roadways. The product of the subtask group effort will be a new specification for HMA for low volume roads (HMA-LV), designed especially for local agency use. So it's important that local agencies have input to the development of this new specification. Anyone interested in participating in this effort should contact the subtask group Chair, Tim Denlay of Knife River Construction at: tim.denlay@knifriver.com



Intelligent Compaction Update

The Intelligent Compaction Subtask Group is a Caltrans-Industry advisory group working to advance the implementation of Intelligent Compaction (IC) technology in California. IC was included in the list of FHWA 2013-2014 "Every Day Counts" (EDC-2) initiatives. The first demonstration project in California was conducted on I-80 in Solano County, CA, in 2013. In 2014, upon development of the IC non-standard special provisions (NSSP) and design guidelines, IC was included in several CIR and HMA projects. IC-equipped rollers facilitate real-time control of compaction by monitoring roller passes, surface temperature and material stiffness, and permit timely adjustments to the compaction process. These rollers maintain a continuous data record of precise location of the roller using GPS, the number of roller passes, and material stiffness measurements. The data can be processed using FHWA "Veda" software to create a daily compaction quality control report to ensure that the required roller passes, material temperature and material stiffness (based on material density) are met. The subtask group participants include roller manufacturers, GPS manufacturers, software developers, FHWA, the California Asphalt Pavement Association (CalAPA), contractors, and staff from various Caltrans programs. So far, the group has developed a NSSP for IC for Hot Mix Asphalt (HMA) and for cold in-place recycling (CIR), and has developed design guidelines. IC specifications have been included in 11 Caltrans projects. They've also expanded the types of rollers that can be retrofitted for IC equipment. The subtask group will continue with development of new specifications for IC of soils and full-depth reclamation (FDR), development of training for both contractor



Intelligent Compaction schematic

and Caltrans personnel, and further improvement of the IC technology by participating in nationally sponsored studies. For more information contact Ebi Fini with Caltrans HQ at: ebi.fini@dot.ca.gov

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Surface Seals

The Pavement Preservation Task Group's (PPTG) subgroup on Surface Seals is in the process of rewriting, in their entirety, Sections 37-1 (General), 37-2 (Fog & Chip seals) and 37-3 (Slurry and Microsurfacing) of the Caltrans specifications. This will update specifications for all variety of chip seals, slurry seals and micro surfacing. In addition, the group has finalized a scrub seal specification and is working on a drafting a specification for rubberized slurry seals. For more information contact Scott Dmytrow of Telfer Oil at: scott.dmytrow@telfercompanies.com

RAP/RAS Specification Update

The Caltrans/Industry Rock Products Committee (RPC) Subtask Group on RAP/RAS is scheduled to sunset following the next meeting, in December, 2014. In addition to reclaimed asphalt pavement (RAP), the specification would allow the contractor use of up to 5 percent recycled asphalt shingles (RAS). Allowable shingles include manufacturer's waste and post-consumer "tear-off" shingles. The group has successfully developed a RAP/RAS specification that allows for up to 40 percent binder replacement in lower HMA lifts and up to 25 percent binder replacement on the top (surface) lift. Caltrans plans on issuing a Construction Policy Directive (CPD) in the January – February time frame. The CPD will allow a contractor option to use the RAP/RAS non-standard special provision (NSSP). Prior to the issuance of the CPD, contractors may be allowed to use the NSSP on a project-by-project basis. The new 2015 Standard Specifications will include the RAP/RAS provisions as a contractor option similar to the contractor option for the use of warm mix asphalt (WMA) in the current Standards. As a result of the Caltrans new recycled materials provisions, the use of RAP and RAS at both the state and local level will increase significantly in 2015, notwithstanding local agencies that historically have not taken advantage of the cost savings associated with the use of recycled materials in HMA pavements.

For more information contact Tony Limas at: tony.limas@gcinc.com

Recycling PPTG Subtask Group

The Recycling Subtask Group of the Caltrans-Industry Pavement Preservation Task Group (PPTG) has provided Caltrans a draft specification for CIR using a "foamed asphalt" recycling agent. Other efforts have focused on possible improvements to the NSSP for CIR done with emulsified recycling agent (ERA). This included forming a subcommittee to develop language for compaction criteria. Discussion was also held with respect to PG grade requirements for the base asphalt used in the ERA. It's been suggested that if the ERA was manufactured using a base asphalt that is in compliance to the AASHTO M320 specification for PG 64-22, it should be suitable for all climatic regions in CA. Caltrans provided suggested revisions to Lab Procedure No.8. (LP-8), which is used to develop job mix formulas for CIR done with ERA. Caltrans indicated the goal is a procedure that ensures final air voids of the CIR are between 8 to 12%. A subcommittee was formed to investigate possible alternatives for reaching this goal.

A subcommittee was also formed for evaluation of the CIR smoothness specification. The subcommittee recommended six options to consider for improvement to the smoothness portion of the specification. It was stressed by all parties that this is a serious issue, not only CIR, but also HMA overlays. There has been difficulty in meeting the smoothness specification and a lot of time and money has been spent meeting the requirements. It was also agreed that a workshop for everyone involved with the CIR process would be a good idea.

For more information contact Don Mathews with Pavement Recycling Inc. at: dmathews@pavementrecycling.com



CIR equipment train

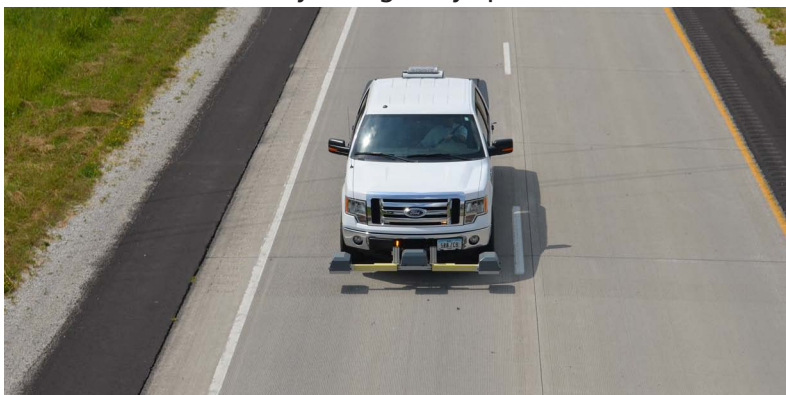
Pavement Smoothness Using “IRI”

By Mike Robinson, Pavement Consultant

Pavement smoothness has become an increasingly important aspect of paving projects, and rightly so. Smoother pavements are obviously preferred by the traveling public, because smoother pavements provide more comfort and reduced vehicle maintenance costs. Smoother pavements also last longer and stay smoother longer, as the dynamic effects that magnify wheel loads as they travel over roughness are reduced.

Smoothness has been a component of virtually all pavement projects for a long time, but the means by which smoothness is measured and the smoothness standards have evolved. A straightedge is an intuitive and easily understood device, and is still valuable for quality control during construction to evaluate construction joints, quarter crowns, and similar aspects. The California Profilograph, which is usually employed on higher speed roadways, involves a specification that includes both “must grinds” and a Profile Index (PI). Must grinds are localized areas severe enough to warrant correction regardless of how smooth the remainder of the surface is. The PI value accumulates smaller areas of roughness into a segment total in “inches per mile” to ensure overall pavement smoothness.

Caltrans, like much of the paving industry across the US and even internationally, has now adopted the Inertial Profiler (IP) device for smoothness evaluations as a replacement for the California Profilograph. Inertial profilers utilize accelerometers and laser height measurements to evaluate pavement smoothness based on how both a vehicle and occupants respond to roughness as they travel over a roadway at highway speeds.



Inertial Profiler working at highway speed

Accompanying the change to inertial profiling is a change in the measurements used for evaluation and acceptance. Caltrans, like many other agencies, now uses “International Roughness Index”, or IRI, and “Mean Roughness Index,” or MRI. MRI is simply an IRI roughness measurement averaged over both wheel tracks for a given pavement segment, usually 0.1 mile (528 feet). “Must grinds” are now known as areas of localized roughness (ALR).

Inertial profilers collect large quantities of data, and a software is required to analyze that data. Caltrans uses “ProVAL”, as do many other agencies. In addition to analyzing the inertial profiler data and converting it into IRI and MRI values, ProVAL offers analysis tools and a ‘grinding simulator’ feature. The grinding simulator is critical to improving smoothness, as it allows you to identify the locations, length, and depths of grinds, using the grinder geometry you expect to employ. This allows for estimation of time and costs required to achieve the desired level of smoothness.

Of course, grinding is not the only means to achieve smoothness. Each step in the construction process that can be used to improve smoothness is considered an “opportunity”, and each opportunity is generally considered to be able to reduce existing roughness by 25% to 35%. In other words, if an existing pavement to receive a single-lift overlay has an MRI of 150 inches per mile, a reasonable expectation is that, by using good paving practices, the MRI after the overlay would be 113 to 98 inches per mile, without performing any additional corrective action, such as bump grinding.

It is important to realize that not every construction step can be considered an “opportunity” to improve smoothness. If the existing pavement profile and cross-slope are used as a reference during milling or paving, little improvement can be expected. Some examples are mill-and-fill and cold-in-place recycling operations using a joint matcher or similar, non-averaging reference for the cold mill. For smoothness improvement, it would be preferable to reconstruct pavements full-width using independent grade control, or at least grade-averaging systems, such as “skis”. The need to

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maintain traffic through the project during construction, the need to minimize surface drop-offs on longitudinal joints for safety, and existing roadway geometry such as short-radius vertical and/or horizontal curves may preclude or at least hamper efforts to improve smoothness at some or all stages of the project.

So what is the best way to approach an overlay project with an existing pavement that has to meet an absolute final smoothness requirement? First and foremost is obtaining inertial profiler data on the existing pavement. By using ProVAL, one can estimate the time and expense required to bring the existing pavement to a smoothness that subsequent construction operations can further improve to meet the final standard. At bump grinding costs of perhaps \$6,000 to \$10,000 per day per machine, this step is essential - not only for bidders, but also for owner-agencies who are working under tight budgets.

However, simply grinding the existing or subsequent pavement layers into conformance may not be the most effective approach. It is possible that grinding costs will equal or exceed the cost of an additional overlay on some projects, even without considering the structural improvement and subsequent pavement life increase that an additional overlay can

contribute. Care should also be taken to avoid grinding the existing pavement surface beyond what is necessary. As an example, if the final smoothness requirement is 75 inches per mile, and you are confident that you can obtain a 30% improvement when placing the overlay, the targeted MRI on the existing pavement, after some grinding, should be approximately 105 inches per mile.

It is also essential that best practices for smoothness be incorporated wherever possible. When cold planning, take advantage of the grade controls and grade averaging equipment currently available for cold mills to create an improved profile. Make sure the drum, teeth, drum speed, and machine speed are all selected based on obtaining smoothness and not simply for high production rates. Paving operations must balance production, haul, placement, and compaction to minimize paver stops.

The use of inertial profilers to measure smoothness does not make current pavement construction operations and equipment obsolete, but it does require additional attention to smoothness and a consideration of the various ways the final smoothness target can be met.

For more information contact: mike@mik-erobinsonllc.com.



Asphalt “User-Producer” Committees Meet

By Roger Smith, CP² Center

The various committees of the Pacific Coast Conference On Asphalt Specifications (PCCAS) met at the University of Nevada, Reno (UNR) on October 7 & 8, 2014. The PCCAS (aka. User-Producer Group) is a long-standing forum for Pacific region state DOT's - a total of 6 - to meet with asphalt suppliers and researchers in the interest of using standardized specifications for asphalt. The CP² Center is an Associate Member of this group and participates in their meetings and research efforts. Here's an overview of the various committees' activities.

Paving Asphalt /HMA Committee

- MSCR – The MSCR test is a proposed new test and specification for an asphalt binder's high-temp properties using the DSR test machine. A round-robin involving 16 labs

was completed via the Asphalt Institute and found that precision and bias look comparable to other PG tests. At present, Washington is the only state DOT planning to implement the MSCR test – probably in 2016.

- Rubber Additives – Work is continuing on using PG grading methods for rubberized binders and using the DSR for testing asphalt rubber (AR) binders with coarser crumb rubber (e.g. California type). A new test method using the plate-to-plate DSR with a 3mm gap has been developed, and Phase 1 of a round-robin study has been completed, with 10 labs – including CP²C - participating. Initial conclusion is that the precision of this test method looks good.

A Phase 2 round-robin is being planned involving three different binders with a goal of developing a precision and bias statement for this new test method.

Emulsion Committee

The Emulsion Committee is focusing of coming up with a better method for obtaining the emulsion's asphalt residue for testing purposes. The primary concern is that overheating the emulsion in order to evaporate the water may be altering the properties of the residue, especially polymer (latex) additives typically in chip seal emulsions (e.g. PMCRS-2). A gentler method involving realistic field temperatures is being sought. Ultimately, this group hopes to use the PG grading system to characterize the asphalt residue from emulsions. Various methods for doing this are being looked at nationwide.



Recycling Committee

The state DOT's gave updates on their recy-

cling policies with the general finding that most states now allow both reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS) in their HMA. Some states allow a maximum amount of "binder replacement" due the combined effect on RAP & RAS. Nevada and Alaska only allow RAP at present. The amount of RAP allowed for surface lifts ranges from 15% to 25%. For lower lifts, the allowable RAP amount is as high as 40%.

Proper mix design for cold in-place recycling (CIR) projects was the topic of a presentation by Dr. Eli Haj of UNR. Worth noting are the conclusions that lime additive can greatly improve moisture sensitivity (T-283 results), "engineered" emulsions give better performance, and rut resistance of the CIR mix is generally good.

These committees will meet again in October at UNR in Reno.

For more information on PCCAS go to www.pccas.org.



Caltrans Initiated a Shrinkage Study for Rapid Set Concrete

By Ding Cheng, CP² Center

The current Caltrans specification for shrinkage testing of portland cement concrete (PCC) pavement calls for the initial measurement to be made at 7 days age, which is based on AASHTO T160. However, this initial measurement age may not be appropriate for rapid strength concrete (RSC), as significant shrinkage due to hydration may have already occurred. As a result, Caltrans office of rigid pavement contracted with the CP² Center to study shrinkage of different RSC with various additives to determine if this practice will work for RSC.

This study consisted of evaluating shrinkage using the initial measurement at the age intended for opening the PCC pavement to traffic using the current specified protocol. Variables included in the study were types of cement and types of concrete additives. Only one aggregate source was used.

Mix design proportions for 6 RSC mixtures shown in Table 1 were determined using a volumetric method. This included two mix design proportions for each of the 3 different cement/admixture combinations. These proportions were determined by trial batching. The three combinations were: TXI Type III cement with

WR Grace admixtures, TXI Type III cement with BASF admixtures, and CSA cement with BASF admixtures. The PCC mix was designed for two strength levels of 400 psi at 4 hours, and 550 psi at 3 days.

Table 1. Rapid Strength Concrete (RSC) Mix Design Combinations*

Strength Requirement	TXI Cement	TXI Cement	CTS Cement
400 PSI in 4 Hours	BASF Admixtures	WR Grace Admixtures	BASF Admixtures
550 PSI in 3 Days	BASF Admixtures	WR Grace Admixtures	BASF Admixtures

*Note: CTS RSC may use either WR Grace or BASF admixtures for their mixes

Flexural test specimens were fabricated according to the AASHTO R 39 test method. Strength was determined per AASHTO T 97 by taking the average of a minimum of 4 beams for each PCC mixture during the final production and verification, and 1 beam during trial batching for shrinkage testing. Figure 1 shows a beam being tested at the Chico State University engineering laboratory. For each of the 6 RSC mixes, shrinkage tests were performed as specified in Section 90 of the

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Caltrans Standard Specifications, as well as additional testing with modifications.

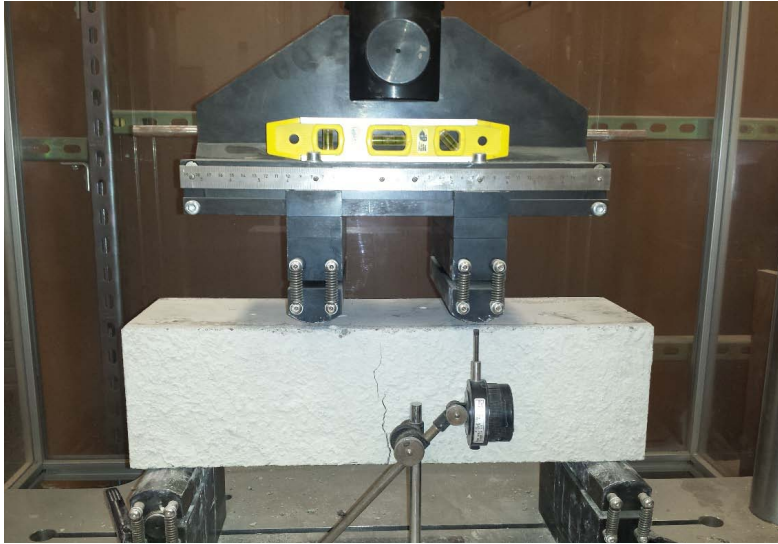


Figure 1. Flexible strength testing on RSC sample

The shrinkage samples were placed in an environmental chamber for the dry curing conditioning. The temperature was set at 73°F with a relative humidity of 50%. The shrinkage of the samples were measured with a “comparator” device shown in Figure 2.

The following are some preliminary conclusions of the RSC shrinkage study for Caltrans:

- For the 4-hour (400psi) mix designs, the 4-hour vs. 7-day initial measurement’s 28-day results showed that significant shrinkage happened during the first 7 days in dry conditions. The 28-day shrinkage for the initial shrinkage measurement at 4-hour age was significantly higher than that of the initial shrinkage measured at 7-day



Figure 2. Shrinkage measurement with a “comparator”

age for all three mixes. Therefore, the current Caltrans Section 90 shrinkage measurement method does not reflect the 4-hour mix’s real shrinkage in the field.

- For the 3-day, (550 psi) mix designs, 3-day vs. 7-day initial measurement’s 28-day shrinkage results showed that significant shrinkage happened during the first 7 days in dry conditions. The 28-day shrinkage for the initial shrinkage measurement at 3-day age was higher than that of the initial shrinkage measured at 7-day age. Therefore the current Caltrans Section 90 shrinkage measurement method does not reflect the 3-day mix’s real shrinkage in the field.
- Based on these test results, the type of cement used had a larger impact on shrinkage than the type of admixture used.

The CP² Center appreciates the funding support of the Caltrans for this important and meaningful study. We would also like to extend our gratitude to Doran Glauz of Caltrans, who provided continuous technical support and to Hector Romero, Cornelis Hakim, and Nick Burmas from Caltrans Headquarters. We would also like to thank Vince Perez, and Art Bigelow from CTS Cement, John Mexsmore from TXI Cement, Greg Guecia from BASF, Joe

Terrill from WR Grace, and A & A Concrete Suppliers for their contributions and assistance during the project. We appreciate Tonya Komars and Scott Burghardt for letting us use some of the Concrete Industry Management Program’s equipment for this study. We would also like to thank Barry Lotz with Capital Engineering Laboratories for letting us use their flexural and shrinkage molds for the study.

Crack Sealing Innovations By Jim Chehovits, Crafc0 Inc.

At the Phoenix meeting of the Rocky Mountain West Pavement Preservation Partnership (RMWPP), recent innovations in crack treatment were discussed, including:

- crack seal vs. crack fill
- crack treatment design process
- meltable packaging

- use of mastics for wide cracks
- equipment innovations

Reported benefits of crack treatments include slowing pavement deterioration, reducing potholes and depression formation, slowing crack spalling, extending pavement life, cost effectiveness, and providing an effective pre-treatment

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for other preservation processes.

In a recent NCHRP Report 784 titled "Best Practices for Crack Treatments" it was reported that most agencies made no distinction between crack 'sealing' and crack 'filling'. But it's worth noting that crack sealing is generally used for high movement cracks ($> 1/8$ inch annual movement, such as thermal cracks spaced at over 15 to 20 feet), while crack filling is generally used for lower movement cracks ($< 1/8$ inch annual movement such as longitudinal cracks or other crack types spaced at less than 15 to 20 feet). The main differences between the processes are that crack "sealing" uses more flexible, extensible sealants installed in reservoirs designed to accommodate the expected movement, whereas crack "filling" generally just fills the existing cleaned crack with appropriate sealant or filler.

It is important to follow good design principles when using crack treatments. This includes doing a pavement evaluation to determine the type, severity, and spacing of the cracks in order to determine whether it is a crack seal or fill project. Then temperature extremes for the project need to be determined to appropriately select the crack treatment product and installation geometry. The "LTPPBind" program is the best way to determine the pavement temperature extremes for the location. Most states in the western region have several climatic zones with different ranges of high and low temperature extremes and therefore differing magnitudes of expected crack movements. These differences can necessitate use of different crack treatment products and installation geometries to resist temperature extremes and movements. For example, Caltrans has 5 different sealant specifications for the various LTPPBind regions in the state.

After it has been determined if it is a seal or fill project, and the temperature ranges have been identified, the next step is to determine the preferred installation geometry (shape) for the crack treatment reservoir. Figure 1 shows crack movements with fill and reservoir type geometries. For fill projects, installation is typically just cleaning and filling the existing crack. For high movement cracks on sealing projects, shaped reservoirs are needed to resist the higher movement amounts. Recommended reservoir sizes are shown in Table 1 for differing ranges of high and low temperatures determined from LTPPBind.

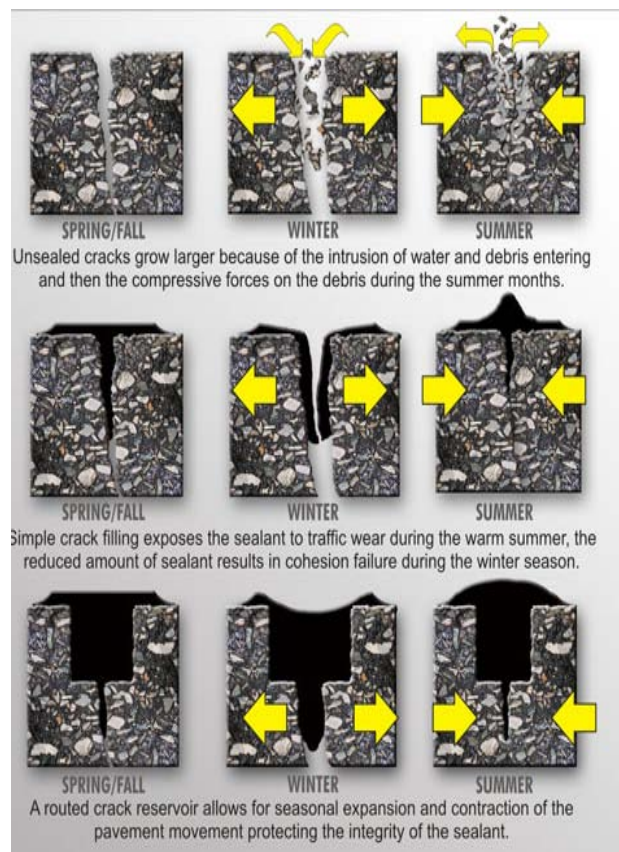


Figure 1. Installation Geometry's for Crack sealing and filling

Table 1. Minimum Reservoir Recommended

Range	Width	Depth
80°C or less	1/2"	3/4"
86°C	3/4"	3/4"
92°C	1 1/8"	1/2"
98°C or greater	1 1/2"	3/8"

Note: These recommendations are applicable for thermal crack spacing up to approximately 50 to 75 feet. For greater spacing, the next wider width can be used for improved results. Reservoir width should not exceed 1 1/2".

For sealing projects, the sealant needs to adhere to the pavement and not crack during low temperature extension. This can be evaluated using bond-extension or specialized flexibility type testing at the expected low temperature. Crack sealants require higher extensions than crack fillers because they incur more movement. At high temperatures, the softening point is typically used to assure the sealant or filler is stiff enough. Caltrans uses the softening point and specialized low temperature flexibility limits shown in Table 2 for selecting crack sealing materials for their 5 different climates.

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Table 2. Sealant type for various climates

Property	Type 1	Type 2	Type 3	Type 4	Type 5
Softening Point	102C	96C	90C	84C	84C
Flexibility	0C	0C	0C	-11C	-28C
Typical Climate Use	76-10	70-10	64-10	58-16	58-28

The final steps include installation and finishing. During installation, weather should be dry and pavement temperature at least 40 °F. Reservoirs should be cut (routed) to the proper dimensions and should be centered in the crack. Crack cleaning should be accomplished using compressed air, heat lances, or vacuum systems to produce clean, dry, and intact crack surfaces for the sealant to bond to.

The final installation step is finishing, which refers to the sealant configuration at the pavement surface. Recessed sealant, approximately 1/4 inch below the pavement surface, is generally used when the installation will soon be followed by a hot mix asphalt (HMA) overlay. Sealant can also be installed in a flush fill to surface level, or using an overband cap approximately 1/16 inch thick by up to 4 inches wide on top of the crack. Routed reservoirs finished with the overband cap have been shown to be the best performing installation geometry.

Other innovations discussed at the RMWPPC meeting included:

- Meltable, boxless packaging. Several versions are available and all melt quickly and do not affect the properties of the sealant. There is less handling, and no cardboard boxes to ship, open, handle or dispose of.
- Hot-applied "mastic" repair for larger (wider) cracks (Figure 2). These materials are flexible, water proof,

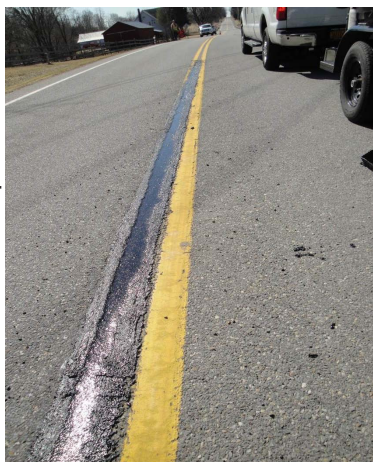


Figure 2. Mastic sealer for large (wide) cracks

highly adhesive, aggregate filled, require no compaction and can be opened to traffic early. They also provide good skid resistance. They can be used in wide crack up to 8-12 inches and for small patching.

- Equipment innovations include items such as melters with self-contained compressors, and vacuums to clean cracks and reduce dust. Other innovations include dust collection systems for the routers (Figure 3), improved heating systems for the melter, and specialized installation tips (Figure 4).



Figure 3. Dust collecting router



Figure 4. Special tool for larger cracks

For more information on these innovations, please contact Jim Chehovits at: jim.chehovits@crafco.com. The full presentation from the RMWPPC can be found at: https://pavementvideo.s3.amazonaws.com/2014_RMWPPP/PDF/12%20-%20Crack%20Sealing%20Innovations%20-%20Chehovits.pdf

RMWPPP Meets In Phoenix By R. Gary Hicks, CP² Center

Over 80 people attended the annual meeting of the Rocky Mountain West Pavement Preservation Partnership (RMWPPP) in Phoenix, AZ, October 8-10, 2014. All states were represented with the exception of California, Colorado, and Wyoming. Over 20 vendors also participated in the event sharing their knowledge and discussing their products and services.

The meeting began with a Workshop dealing with "Preservation Treatments for High Volume Roads" put on by David Peshkin (APTech), the principal investigator for this SHRP 2 funded project. The afternoon sessions consisted of welcoming addresses by the Arizona DOT and FHWA, Arizona Division, followed by the keynote speaker, Steve Muller, retired from FHWA, who is a preservation enthusiast trained in part by Jim Sorenson, the father of pavement preservation in the USA. He challenged FHWA and others to ensure we have preservation champions within all agencies. His full presentation, and those of all speakers, can be found at: <https://tsp2pavement.pavementpreservation.org/rocky-mountain-west-rmwppp/annual-meetings/2014-2/>

The next set of presentations dealt with work the FHWA Emulsion Task Force (ETF) is doing to improve specifications for emulsions, chip seals and micro surfacing, and to reduce the chances for early failures. Chris Lubbers, co-chair of the ETF with Colin Franco of the Rhode Island DOT, discussed the background and history of the ETF as well as their deliverables, particularly the proposed new specifications for emulsions. Jim Moulthrop (FP²) and Gary Hicks (CP² Center) discussed the deliverables for the chip seal and micro surfacing specs, as well as the best practice documents that are being developed. The afternoon session also included a presentation by Mike San Angelo, Alaska DOT&PF Materials Engineer, on quality assurance, which was followed by a panel discussion on the need for a Quality Assurance Program (QAP) for preservation products that includes the following elements:

- quality control requirements for contractors
- acceptance testing by the agency
- the general need for improved performance testing for preservation treatments

The discussion indicated the need for more work to minimize the risk of early failures, such as rock loss for chip seals and early raveling for micro-surfacings.

Day 2 consisted of presentations by industry representatives including Mark Belshe (RPA), who discussed the use of ground tire rubber in preservation treatments. He was followed by Larry Scofield of the International Grinding and Grooving Association (IGGA), who provided an update on concrete pavement preservation and the pooled fund study. These presentations were followed by a presentation on partnering efforts between MNROAD and NCAT on future field studies involving pavement preservation strategies. This collaboration offers the opportunity to study preservation treatments under traffic and in different environments. Presentations were then given by the various participating states. The presentation for Caltrans was given by Dr. Gary Hicks of the CP² Center.

The RMWPPP has several Task Groups that are still active. They include ones dealing with the cost effectiveness (chaired by Rod Mills), communications and marketing (chaired by Mark Beatty), specifications (chaired by Mike Santi) and research (chaired by Dave Luhr). The second day ended with a presentation by Jim Chehovits of Crafcro on "Innovations in Crack Sealing" (see pp 15-17). This was followed by a field trip to the Crafcro facility in Chandler, AZ, and an evening of networking with the group.



Jim Moulthrop (FP²) and Mike San Angelo (ADOT&PF)

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The final day consisted of presentations by Scott Gibson of the Regional Transportation Commission (RTC) in Reno NV, by Jim Moulthrop (FP²) with an update on the impacts of the US Department of Justice/FHWA "ADA" Technical Advisory, and by Tom Van (FHWA) with an update on MAP 21 and the Expansion of the NHS System.



In summary, "take-aways" from the meeting included:

1. Preserving pavements is an important program in each agency, because it's cost effective and good public policy.
2. FHWA must continue to be engaged and emphasize the importance of pavement preservation as a vital function of asset management.
3. There's need for research in the development of QA practices for both flexible and rigid pavement preservation techniques.
4. Refinement of specifications for emulsions will be a continuing effort.
5. Multiple lift surface treatments can be effective on PCI's less than 50, as demonstrated in California.

The next RMWPPP regional meeting is planned for October, 2015, in Bozeman, MT. For more information on the group and how to participate, please contact Mike San Angelo of Alaska DOT&PF (the incoming chair) at michael.sanangelo@alaska.gov.



NWPMA Conference A Great Success By Todd Scholz, GeoDesign, Inc.

Over 200 attendees participated in the 2014 Northwest Pavement Management Association (NWPMA) Conference held this year in Seattle, Washington, October 28-31. With a lineup of three pre-conference workshops and 30 conference sessions, speakers provided timely presentations concerning pavement management practices and implementation.

The first pre-conference workshop included presentations on the changing methods for pavement data collection. Each speaker provided some historical perspective on data collection, and a look into the future with regard to automated and semi-automated data collection and reduction systems.

Mr. Justin Manville of HDR, Inc. and Mr. Steve Townsen of the Portland Bureau of Transportation (Figure 1) provided presentations on asset management in the second pre-conference workshop.

Figure 1. Justin Manville and Steve Townsen (L-R)



In the third pre-conference workshop, Dr. Mo Shahin provided a presentation on pavement management for local agencies. He covered the components of pavement management, inventory definition, condition assessment, condition prediction, performance analysis, budget optimization, project formulation, and the risk of not performing timely maintenance and rehabilitation.

Mr. David Luhr of the Washington State Department of Transportation (WSDOT) provided the keynote presentation on WSDOT's pavement management practices and lessons learned.

The technical sessions covered a variety of topics related to pavement management, including

pavement rating methods, guidelines for setting practical performance targets, pavement management system implementation, advanced pavement management, specifications, maintenance treatment types, and others.

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Vendor sessions ran concurrently with the technical sessions and covered many of the same topics. A few select technical session presentations are summarized below. Most of the technical session presentations are available at: <http://www.nwpma-online.org/presentations.html#pre2014>.

Mr. Sui Tan (Figure 2) of the Bay Area's Metropolitan Transportation Commission (MTC) kicked off the technical sessions with a presentation identifying emerging practices regarding the use and implementation of performance measures for asset management in MAP-21. He indicated that MAP-21 requirements focus on performance, accountability, and transparency, and emphasized that the development of a strategic plan with goals and objectives is essential in fulfilling the MAP-21 requirements. He provided examples of ways to assess pavement performance and how these performance measures can be utilized in developing reports for both internal and external stakeholders to show where and how taxpayer's money is spent, and the effectiveness of the expenditures.

Mr. Jim Huddleston, Executive Director of the Asphalt Pavement Association of Oregon, made a presentation on ways of improving performance of local agency pavements. He identified three simple (and proven) steps that local agencies can take to vastly improve

the durability and cracking resistance of their pavements without risk of increased rutting, and with little increase in cost.

Professor Roger Smith of Texas A&M University (retired), and consultant to MTC, provided presentations throughout the conference. His first covered pavement condition rating utilizing MTC's "StreetSaver" pavement management system software. Dr. Linda Pierce of

Applied Pavement Technology, Inc. and Mr. Ryan Miles, Civil Engineer for the City of Vancouver, Washington made a joint presentation covering the implementation of the "StreetSaver" pavement management system software for Vancouver.

Three other technical sessions covered asphalt

concrete specifications, one session each for Idaho, Oregon, and Washington.

The importance of this conference to industry stakeholders was evidenced by the participation of nearly 30 vendors, paving contractors, slurry seal and micro-surfacing contractors, specialty materials producers, equipment manufacturers, consultants, and the Metropolitan Transportation Commission (MTC). Mark your calendars for the next NWPMA Conference, which will be held October 20-23, 2015 in Vancouver, Washington.



Figure 2. Teresa Gibson (City of Hillsboro, OR) and Sui Tan (MTC)

FHWA Update By Steve Healow, FHWA, California Division

- When the 114th Congress convenes on January 6, 2015, will surface **transportation funding** reauthorization and the Highway Trust Fund (HTF) be on their agenda? Congressman John Boehner (R-OH) mentioned in an October interview that transportation reauthorization is something he and the president should be able to agree on. But the November 6 *Wall Street Journal*

article, which the House majority leader coauthored, includes seven items on his legislative agenda, but there is no mention of either surface transportation reauthorization or the HTF. The lame duck session of the 113th Congress is living down to expectations. A review of the websites for the House transportation and infrastructure committee, and for the Senate environment and public works

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- committee turned up no news for either surface transportation funding or the HTF.
- Have you seen the new **Intelligent Compaction** (I.C.) rollers compacting subgrade soil, granular base, or hot mix asphalt yet? I.C. rollers are equipped with accelerometers on their drum axles, GPS mapping, infrared temperature sensors and onboard computers with real-time, color coded displays of roller passes, stiffness of compacted materials, and surface temperature. [2] IC is a potential time saver intended to improve compaction by providing real-time feedback to the roller operator re. surface conditions and real-time results of the compactive effort. I.C. is still in development and there are several lingering issues. I.C. is data intensive. A customized software package (Veda) was developed to analyze the reams of data, regardless of the make and model of roller used. In California specifications have been drafted for cold in-place recycling and asphalt paving. Two projects have been completed. By November 2015 there may be as many as thirteen completed projects in the state. See more information at <http://www.fhwa.dot.gov/construction/ictssc/>.
- Pursuant to MAP-21, Section 1203, "National goals and performance management measures", there is a forthcoming Notice of Proposed Rulemaking (NPRM) which will directly affect the way State DOT's and Metropolitan Planning Organizations (MPO's) do business. The purpose of the new regulation is to implement Congress'

intent to transform the **Federal-aid highway program** into a performance-based program, with focus on the seven national transportation goals enumerated in Section 1203.

The NPRM will include proposed performance measures for pavements and bridges on the National Highway System (NHS). It will be the responsibility of State DOT's and MPO's, which own and maintain NHS routes, to establish performance targets and to report their progress toward achieving their targets. These national goals and performance measures will also have a direct impact on allocations from the federal Highway Trust Fund. Read more about performance measures here: <http://www.fhwa.dot.gov/map21/qandas/qapm.cfm>.

- Everyone's very busy, but here's a great **reading list**:
 1. "Street Fight: The Ongoing Battle for Better Bay Area Pavement" www.mtc.ca.gov/news/street_fight/
 2. "California Statewide Local Streets and Roads Needs Assessment" <http://www.cacities.org/Top/News/Press-Releases/2014/October/2014-Local-Streets-and-Roads-Report.html>
 3. *Better Roads* op-ed piece: www.betterroads.com/do-as-i-say-not-as-i-do/
 4. This *60 Minutes* segment from Nov. 23: <http://www.cbsnews.com/videos/falling-apart-americas-neglected-infrastructure/>



FP² Update By Jim Moulthrop, FP², Inc.

The National Center For Asphalt Technology (NCAT) and MN Road in Minnesota have agreed to collaborate on pavement preservation research on both flexible and rigid pavement systems. The information to be gained from this "national" study will be invaluable to the preservation industry in the documentation of the performance characteristics of various treatments and the life extending benefits of pavement preservation.

Now that the 2014 Mid-Term election is over and the Senate will be restructuring in January,

2015, perhaps both Houses of Congress can move ahead with the development of a long term, adequately funded, transportation re-authorization bill. Representative Shuster (R-PA) will continue to Chair the House Transportation and Infrastructure Committee and Senator Boxer (D-CA) will be replaced by Senator Inhofe (R-OH) as the Chair of the Senate Environment and Public Works Committee. FP² will continue efforts on Capitol



Continued, next page

Hill to assure that the preservation language in MAP-21 is not impeded.

An exciting program is planned for the Pavement Preservation & Recycling Summit (PPRS) in Paris in February of 2015. Visit the Summit website at www.pprsparis2015.com to view the program and all the activities associated with the meeting.

If you are attending the annual Transportation Research Board (TRB) meeting in Washington, DC, in January, 2015, plan to visit the FP² booth # 1715 in the exhibit hall and plan to attend our hospitality suite located on the mezzanine level of the Washington Marriott Marquis hotel.

For more information go to: www.fp2.org



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

The California Pavement Preservation (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 laboratory 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
- participation in events to promote pavement preservation
- delivering training classes



This funding must come from non-contract sources such as our Patrons Program (P²). Patron supporters of the CP² Center can benefit from:

- general promotion of P² concepts (e.g., via our newsletter)
- an increased market for P² products and services
- training programs in P² technology
- assistance with research, both lab and field
- availability of a credible "3rd party" for technical expertise
- participation in special meetings and conferences



The next annual Patrons Meeting and Open House will be held at the Center in mid March, 2015. We are always seeking to expand our Patrons group.

For more information on how to join and the benefits of joining, please contact Co-Chairs, Dr. Gary Hicks at rg Hicks@csuchico.edu and Dr. Hans Ho at hansho@telfercompanies.com. More information on the Patrons Program can also be found on the Center's website at <http://www.csuchico.edu/cp2c/>



COMING EVENTS

Mark Your Calendar (Coming Events)

California Chip Seal Association (CSSA) Spring Workshop, February 4-5, (City of Industry)

The CCSA twice yearly Spring Workshop is returning to Pacific Palms Hotel and Conference Center in City of Industry, CA on February 4 & 5th, 2015. This popular event will feature:

- Hands on Equipment Usage and Calibration breakout sessions..
- Multi-layer systems discussions
- Chipseal, slurry, and micro inspection tips.
- Slurry/Micro mix design training
- Information on using recycled materials in pavement preservation
- and more...

As always, the event will provide an opportunity to interact with vendors of products and equipment for pavement maintenance. For information on the Workshop please visit the chip seal association website by clicking [here](#).



"In-Place Asphalt Recycling & Soil Stabilization Strategies (IDM-26), January 6-8, 2015 (Online Class) U.C. Berkeley / ITS

For the forward-thinking agencies that want to make the shift to eco-efficient in-place asphalt recycling techniques and a proactive pavement preservation plan, the backbone of that shift is a well-executed pavement management program. Students taking this series of courses will learn the essentials of how to successfully maintain an existing or implement a new PMS



(pavement management system) from scratch within their agency.

For more information on this and other pavement related classes go to: <http://www.techtransfer.berkeley.edu/index.php>

"Hot Topics in HMA" CalAPA Educational Events (2 locations)

1. Central Valley - January 28, 8:30 to 3:00 at Hodel's Restaurant in Bakersfield. For more information go to: <http://events.r20.constantcontact.com/register/event?oeidk=a07ea4v61ss03995080&llr=bisj8dcab>
2. Central Coast - February 17, 8:30 to 3:00 at the Santa Ynez Valley Marriott in Buellton. For more information go to: <http://events.r20.constantcontact.com/register/event?oeidk=a07ea4vd7cq9d3b36e3&llr=bisj8dcab>

CP²C Patrons Meeting and Open House - Mid March at CP² Center (Chico)

The CP² Center is supported in part by patrons. Various levels of Patron participation are available. The annual Patrons Meeting is an informative event and a chance to tour the Center's lab facilities. For more information contact Gary Hicks at: rg Hicks@csuchico.edu



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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