



# CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

No. 24

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## CalAPA's Fall Conference Sets Record Attendance

By Roger Smith, CP<sup>2</sup> Center, and Russell Snyder, CalAPA

The California Asphalt Pavement Association (CalAPA) held its Fall Asphalt Pavement Conference in Sacramento on November 1. The conference provided an opportunity for over 300 attendees to hear timely presentation and to interact with exhibitors offering pavement-related products and services.

"We were pleased to have a record atten-



Caltrans Director Malcolm Dougherty and CalAPA Executive Director Russell Snyder

dance for this event, which we think was due partly to the quality of the speakers and the valuable information provided," said CalAPA Executive Director Russell Snyder. "The feedback we received from attendees was overwhelmingly positive, and the many exhib-

itors on hand made for a truly interactive and enriching experience. Since this was the first conference put on by our newly unified statewide association, kudos go to our event steering committee and the many volunteers who did a tremendous job of planning and executing this successful event."

A keynote speaker was Mike Acott of the National Asphalt Pavement Association (NAPA) who updated the group on national issues related to asphalt pavements, including recent health and safety findings. Based on scrutiny of paving asphalt involving international research, the industry is now "in good shape" regarding concerns about asphalt health effects. He also elaborated on life-cycle cost advantages of asphalt pavement vs. concrete pavement.

The other keynote speaker was Caltrans

Director Malcolm Dougherty. Dougherty noted that Caltrans currently has under contract more than \$10 billion worth of transportation system improvements, a high water mark for the department, due largely to an infusion of federal economic stimulus (ARRA) funds and Proposition 1B infrastructure bond funds. Those funds have reversed a historic trend in worsening pavement condition in California, he said. The current level of funding for transportation, however, is on the wane and transportation planners are concerned about how to preserve those hard-fought gains. Inflation has reduced the buying power of fuel taxes devoted to roads to about half of what they were in the 1990s, the last time the tax was raised in California.

"I've been challenging our organization and

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staff to stretch every dollar,” Dougherty said. Caltrans’ highway construction and reconstruction is largely handled by private-sector contractors and suppliers under Caltrans supervision. That public-private relationship is vital to ensuring tax dollars are spent wisely, Dougherty said. “Our partnership with industry is very important.” He went on to say, “We are putting pavement condition at the top of our (priority) list. The last thing I want to see us do is fall back in the area of pavement condition.”

The group was also addressed by Assembly Speaker Pro Tem, Fiona Ma, author of a bill (AB 812) in the State Legislature on recycled asphalt pavements. Ma, the termed-out San Francisco Democrat, commended the industry for embracing environmentally progressive practices such as the implementation of Warm Mix Asphalt (WMA), the use of Ground Tire Rubber (GTR) in asphalt and Reclaimed Asphalt Pavements (RAP). Her bill to encourage Caltrans to boost the standard RAP content of pavement mixes from its current 15 percent limit to up to 40 percent was signed into law earlier this year by Gov. Jerry Brown.

The daylong conference also featured technical presentations and discussions on:

- reclaimed asphalt pavement (RAP),
- recycled asphalt shingles (RAS),
- warm mix asphalt (WMA),
- Caltrans’ move towards the national “Superpave” mix design method,
- Caltrans’ long-life asphalt pavement design projects (e.g., I-710, I-5, and I-80)



Wade Collins (right) of Pavement Technology, Inc. explains PTI’s test equipment to Peter Fitzpatrick (far left) and Eric Richard of Reed and Graham, Inc.

- the “Greenbook” standard specifications used by local agencies in Southern California
- “intelligent compaction” (IC) technology using special GIS equipment on rollers

Electronic versions of all presentations at the conference are available for download from the CalAPA website at: <http://www.calapa.net/2012conference.html>.

Mark your calendars for Cal APA’s spring Conference planned for April 25 in Ontario. Information on all CalAPA activities, as well as technical information on hot topics, can be found on CalAPA’s website: [www.calapa.net](http://www.calapa.net).



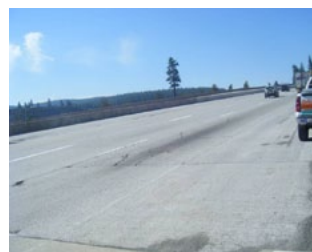
## Protecting Concrete Pavements on I-80 Though the Sierras

By Jaret Montplaisir, Caltrans and Gary Hicks, CP<sup>2</sup> Center

Chain wear on the portland cement concrete (PCC) pavement on I-80 in the Sierras has created significant problems, including rutting in the wheel paths and increased tire pavement noise. Caltrans has experimented with several techniques to reduce the wear including thin asphalt overlays as sacrificial layers and sealants which harden the concrete. Without treatment, the PCC pavements will rut from chain wear and become noisy within a few years.

In September/October of 2011, Caltrans placed thin asphalt overlay on about 10 miles of I-80

through the Town of Truckee. A 30 mm rubberized warm mix using a 1/2 inch gap-



Example of surface distress in the PCC pavement prior to the overlays

graded mix was placed in the westbound direction. It was placed by Sierra Nevada Construction of Reno, Nevada. The asphalt binder was a terminal

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blend rubberized binder produced by Paramount Petroleum (PG 64-16). The formulation contained the warm mix

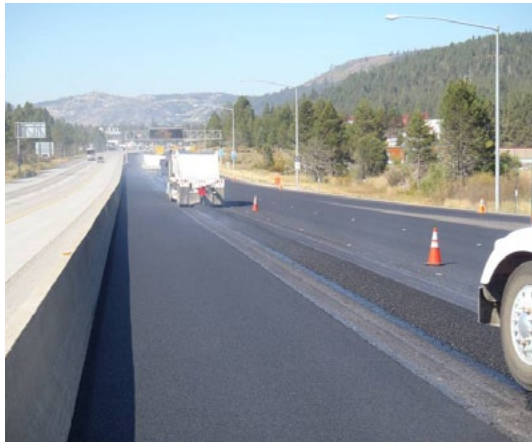
additive (Evotherm) produced by Mead Westvaco. The existing PCC pavement, placed in 2000, had ruts in the truck lane up to 1/2 inch deep, and was already producing increased tire noise. The fast lane was in relatively good condition.

In May/June 2012, a thin bonded wearing course (BWC-G)

was placed using a 3/8 inch gap-graded mix in the eastbound lanes. It was placed by the same contractor at a thickness of 30 mm. Paramount Petroleum supplied the asphalt binder which was a PG 64-28 polymer-modified product. Again, like the

2011 project, the existing PCC pavement exhibited rutting and tire noise in the truck lane. A similar overlay had been placed on I-80 near Soda Springs which wore quickly under the chains and snow plows. Unfortunately, this mix was not the type of mix normally used in

high elevation areas; therefore, the product placed in 2012 through Truckee had tighter specifications on the aggregate and binder, and an increased binder content to provide better film thickness on the aggregate. The current condition of the asphalt overlays is generally good, but some ruts in the existing PCC are reappearing in the asphalt



Placement of the thin rubberized asphalt overlay in the westbound lane



Rubberized asphalt overlay in westbound direction, November 11, 2012



Thin bonded asphalt overlay in eastbound direction, November 11, 2012

in the truck lanes. It would have been better to fill the ruts or grind the PCC prior to placement of the asphalt overlays, but funds were not available to do this. Short sections of the asphalt in the westbound truck lane have already been replaced because of this issue.

These asphalt overlays were placed to provide a sacrificial layer to prevent the PCC pavement from deteriorating further. Caltrans feels that if they can get 3-5 years of service from the overlays, the project will be a success.

Thin bonded wearing courses have performed well over Echo Summit on US 50, but the truck traffic volumes are significantly less. Chain wear on bare pavements is very destructive. Similar problems can be found on Interstate 5 in Oregon and Washington where studded tires operate on bare pavements most of the winter. Wheel track ruts as deep as 2 inches have been reported in these states due to studded tire damage. Caltrans will continue to look at alternatives for preventing chain wear on I-80 in the Sierras. For more information on the project, please contact Caltrans' Jaret Montplaisir at:

[jaret.montplaisir@dot.ca.gov](mailto:jaret.montplaisir@dot.ca.gov)



## Caltrans Slurry Project Successful Despite Challenges

By Scott Youngren, Intermountain Slurry Seal

In the fall of 2011, Caltrans District 2 (Redding) awarded a contract to perform 33 miles of Type III slurry seal on State Route 70 from the Butte County Line to State Route 89, Plumas County, in both the eastbound and westbound lanes. State Route 70, is located

along the Feather River Canyon, which runs between Oroville and Quincy, and is considered one of the most popular scenic driving routes in the state of California. It serves as the lowest elevation passageway through the Sierra

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Nevada's, reaching 5,221 feet in elevation. The project was originally scheduled for an HMA overlay. However, due to budgetary constraints the overlay was replaced with a less costly slurry



Multiple slurry trucks delivering Type 3 Slurry, July 26, 2012

ry seal. The project was awarded to the lowest bidder on December 7, 2011 for just over \$2 million. This pavement preservation project consisted of 2,000 yd<sup>3</sup> of AC dig-out performed by Hat Creek Construction, and 7,300 tons of

Type III slurry seal placed by Intermountain Slurry Seal. The slurry seal used a black aggregate supplied by Franklin Construction along with a polymer modified asphalt emulsion (PMCQS-1h) supplied by Telfer Oil. Sweeping was performed by Statewide Construction Sweeping, striping was done by Linear Options, and Titan Traffic Control handled traffic control operations. The Caltrans Resident Engineer was Michael Holtrigel.

The project presented many obstacles from the beginning, and some unforeseen challenges as the project progressed. Initial challenges included water supply issues, tree shading, natural weather disasters, environmental concerns, a high ADT, and traffic control. One unforeseen challenge was the Chips forest fire, which took place within the project limits. It began burning on July 29, 2012, destroying over 65,000 acres, and was not fully contained until mid-September. The thick smoke and threatening flames prohibited slurry operations until safe conditions could be re-established, delaying the project and requiring two additional mobilizations by the contractor.

Also, as a result of the fire, additional sweeping was required aside from the Caltrans- specified amount for slurry seal. Intermountain contracted with Statewide Construction Sweeping to sweep within the project limits before and after the slurry seal application and

whenever there was any soil sediment or debris.

In addition to lost time due to fire complications, the mix design also created challenges that needed to be overcome. The initially proposed mix design consisted of a high quality aggregate; however, it proved to be a reactive aggregate with a fast set time. To overcome the problem, Telfer Oil experts had to formulate an emulsion that would meet the specified mix design and still allow workability of the slurry mix. By combining Telfer Oils' special emulsion and the use of a hydraulic auger spreader, a successful mix was created.

The hydraulic auger spreader enabled the slurry material to extend to the edge of the spreader box without stiffening and setting up before placement. A hydraulic spreader box is designed and constructed to apply a micro-surfacing with quality and consistency. The box is comprised of an inside skid shoe that allows the operator to adjust the box to conform to previous application passes. Material can be delivered in widths from 8 to 14 ft, with the box width adjustable in 6 inch increments. A secondary strike-off system provides a uniform-textured slurry seal. Hydraulically driven spiral flight augers are used in the box on the front and back on each side, and incorporate Urethane Squeegee rubber throughout. A quick connecting side shift and drag box allow for faster box changes.

Traffic handling also posed a challenge. Per Caltrans specification, Intermountain was not allowed to close more than one lane at a time and the closure had to be kept to a maximum length of 1.5 miles. This created a conflict with Intermountain's already restricted schedule. Titan Traffic Control was contracted by Intermountain to provide the traffic control set up and pilot car service.

With such strict lane closure limitations on this



project, it was imperative that both Intermountain and Titan work together to try and minimize lane closure times and traffic delays.

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Placement of Type 3 Slurry on State Route 70, July 26, 2012



With the cooperation of Titan, Intermountain aimed at accomplishing a set time of 10 minutes for every box they laid. This would allow for a faster drying time, which would then permit a section of road to be opened and another to be closed for continuation of work.

The combination of the forest fire, traffic handling, and mix difficulties provided significant

time delays that required extra close management in order for the project to be completed in an acceptable timeframe.

Despite the many obstacles, the project was completed successfully. For more information on this project please contact Caltrans RE [Michael\\_Hollrigel@dot.ca.gov](mailto:Michael_Hollrigel@dot.ca.gov) or me at [Scott.Youngren@gcinc.com](mailto:Scott.Youngren@gcinc.com)



## Economics and Environment Pave the Way for Gains with Full Depth Reclamation

By Tom Tietz, Executive Director of the California Nevada Cement Association

Cities and counties throughout California facing deteriorated roads and scarce funds are turning to Full Depth Reclamation with Cement (FDR-C) instead of conventional full depth removal and replacement. While many pavement problems are found beneath the surface, that's also where a treasure can be found. That "treasure" is the existing aggregate base and sub-base materials, which can be successfully recycled and stabilized in place, along with the worn asphalt pavement. Worth noting is that these are all materials an agency has already paid for.

With the FDR-C process, the existing pavement and base materials are pulverized, mixed with cement and water and compacted to create a strong, durable, stabilized base for a new pavement surface (e.g., hot mix asphalt). Use of the FDR-C process is growing because it conserves precious virgin aggregates and costs less.

Jim O'Kane of Pavement Recycling Systems (PRS) saw his first FDR project in 1979 and has seen its acceptance grow exponentially. "There was reluctance to consider FDR initially because aggregates were inexpensive and in large supply" recalls O'Kane. "Today the differential in cost savings is dramatic. Cities and counties are open to this technique because they know it is proven and can give them an equal or better base at 30-50% less cost. In addition, the cost of cement is hard to beat" Today, an unofficial count shows that at least 85 agencies in California have used some form of FDR.

Utilizing FDR-C is something Westminster Public Works Director and City Engineer Marwan Youssef know a lot about. Westminster has completed 45 miles of pavement rehabilitation with FDR-C for its residen-

tial and arterial streets since the early 1990's.

Youssef gives these tips for when to consider FDR-C: "Full depth reclamation can provide answers when faced with these questions: Does the pavement exhibit surface distress? Is there cracking, rutting or raveling? Is there a need for an increase in load carrying capacity? Is the pavement in a high density residential area? Can the conditions no longer accommodate surface treatments or overlays?"

The City of San Leandro has reconstructed 7.3 lane miles with FDR-C since 2008. City Engineer, Ken Joseph notes that, "The use of FDR-C has allowed the City of San Leandro to stretch our road budget to reconstruct more streets than what would have been possible using traditional asphalt concrete over aggregate base designs"

FDR-C has also helped address the soft sub-grade found below most of San Leandro's streets without the use of a thicker road section consisting of additional hot mix asphalt and/or aggregate base. The city explained that because FDR-C also reduces the amount of excavation and haul-off required, it results in less truck traffic and thereby mitigates the effect of construction on traffic congestion and air quality.

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### Key Advantages of FDR-C

by Marwan Youssef, City of Westminster

- Increased road base strength and integrity, which extends pavement life and reduces the amount of future potholes.
- Can be 30-50% less expensive than conventional aggregate base/asphalt pavement reconstruction.
- Takes half the time of conventional reconstruction



**FDR-C process on Newland Street, an Arterial Street in Westminster**



**FDR-C process on a residential street in Laguna Niguel**

Santa Ana is a city that developed an extensive program to deal with a large inventory of failing asphalt residential streets. Santa Ana's approach was to figure out how to do more with less. FDR-C was used to reconstruct 57.8 miles of residential streets from 2009-2011. Jason Gabriel, Santa Ana's Principal Civil Engineer, explained that the economics of FDR was one part of the solution that allowed the city to rehabilitate more than twice the amount of lane miles originally envisioned.

Given the success stories, why isn't the use of FDR more prevalent? Don Greb, Principal Engineer of HSI Engineering in Pleasanton suggests that once an agency realizes this is a real and predictable option, they continue to use the process.

Regarding future acceptance, Greb notes,

"There are still agencies that may have limited knowledge because their pavement management system decision tree doesn't show FDR as an option. Many also look to Caltrans for a specification." The good news is that Caltrans is currently developing a FDR-C specification.

For anyone looking to implement FDR-C and take advantage of a process that is recognized as a cost-saving, environmentally advantageous form of pavement rehabilitation, there are design and construction resources available. To get started on FDR-C, contact Jeff Wykoff at the California Nevada Cement Association at 949-689-6961 or [jeff.wykoff@cncement.org](mailto:jeff.wykoff@cncement.org).



## City of Lancaster Greener with Hot-In-Place Recycling

By Barry White, Technical Marketing Consultant, and Jon Cantrell, City of Lancaster

Efforts over the past year and a half to re-introduce Hot-In-Place Recycling (HIR) of asphalt pavements into California - detailed in the March 2012 issue of this newsletter - are showing positive results. Gallagher Asphalt gave an HIR presentation to the City of Lancaster in July of 2011 that dovetailed nicely with City objectives to rehabilitate and maintain their roads with technologies that would be cost effective and sustainable. The end result is the Lancaster City Council approved a contract with Illinois-based Gallagher Asphalt for an innovative HIR re-surfacing process termed "Re-HEAT" (Recycled Hot Emulsified Asphalt Treatment), which should allow the

City to realize significant savings, repair roads efficiently, and significantly reduce the carbon footprint as compared to conventional methods of surface reconstruction.

While new on the west coast, the HIR Re-HEAT process has been successfully implemented in several other states, including Illinois, Wisconsin, Tennessee, Georgia, and most recently Massachusetts. Lancaster's HIR Re-HEAT project is the first in California, with the decision to utilize the Re-HEAT process evolving as City staff, recognizing the need to stretch roadway funding, researched innovative approaches to pavement preservation.

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"Under current economic conditions, exacerbated by the state taking funds from cities, our engineering and maintenance staff set out to reevaluate our programs and procedures for roadway maintenance throughout the City," said Lancaster Public Works Director, Robert Neal. "We believe the Gallagher "Re-HEAT" process is an excellent way to get the absolute

best value for every construction and maintenance dollar we spend."

In contrast to traditional mill-and-overlay, which typically consists of removing the top 2 inches of asphalt and replacing it with new asphalt, the Re-HEAT process actually

recycles the existing asphalt surface wearing course. During the process, the existing asphalt is heated, separated from the road surface, transferred into an onboard mixing drum where it is uniformly mixed with a rejuvenating emulsion, then windrowed and placed by a paving machine as a new surface course. The rejuvenated asphalt mixture is then immediately rolled per an established roll pattern before opening to traffic, usually within 2 to 4 hours.

Along with potential cost savings, the process is nearly 100% sustainable and has a 60+% reduction in the carbon footprint relative to the typical grinding

and paving method. This new and improved HIR process also greatly reduces visible smoke and emissions associated with earlier HIR efforts due largely to equipment and heating technique improvements over the last 20 years.

"One of the additional benefits of the HIR Re-HEAT process is the decreased turn-around time, compared to a conventional mill-and-overlay project," said Ray Hunt, Capital Engineering Manager for the City. "With this kind of technology, residents can leave for work in the morning before we start the roadwork and come home to an entirely new street by that evening."

Pavements that are candidates for HIR are generally pavements that are in a deteriorated condition requiring more than life-extension



Final HIR mat being placed by screed in Lancaster



ReHEAT equipment train for HIR in Lancaster. Pavement heaters are in foreground



Tines and auger for breaking up the heated pavement for HIR in Lancaster

surface treatments, but still eligible for traditional mill-and-overlay. These include pavements that have existing surface deterioration such as minor rutting, shoving, cracking, raveling, flushing, and loss of surface friction. The HIR process typically operates at depths of 1 to 2 inches, but some projects have been reported to be as deep as three inches. Typical recycled widths are between 10–14.5 feet per pass. Based on the literature, HIR is not recommended for pavements that have total asphalt thickness less than three inches, contain aggregates larger than one inch, have low load-bearing capacity, have extensive rubber crack seal usage, or have surface cracks that extend through the pavement thickness into the underlying base material.

Prior to contract award, a selection was made of five street segments, each with characteristics representative of the majority of the city's streets. These included residential, secondary and primary arterials, representing a wide range of pavement and traffic conditions. The City's engineering staff then developed a coring and evaluation report to verify the thickness and general condition of the roads to be recycled. This helped identify any borderline roads and set the actual initial recycling depth for each road section. The condition of the asphalt material itself was also evaluated to determine whether further lab testing for fitness for recycling was necessary.

Since this HIR process can be done at temperatures down to the low 40's, the project will likely continue into December. The total area to be treated during the current project is approximately 110,000 square yards and is anticipated to take around 30 working days to complete.

"We are very excited to be underway and talk to other local agency representatives visiting the project site this week. We enjoy sharing our experiences with others to promote recycling in the management of roadway networks," said Lancaster's Ray Hunt.

# CP<sup>2</sup> Center Helps Alaska DOT&PF Develop a Pavement Preservation Database and Strategy Selection Program

By Angela Parsons, Alaska DOT&PF and Ding Cheng, CP<sup>2</sup> Center

Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) wanted to enhance its existing pavement preservation program and recently sponsored a research project titled "Develop Guidelines for Pavement Preservation Treatments and for Building a Pavement Preservation Program Platform for Alaska". The project was a collaboration of the Alaska DOT&PF with the California Pavement Preservation (CP<sup>2</sup>) Center and the Alaska University Transportation Center (AUTC). An important part of this research was the development of a pavement preservation treatment database with an on-line strategy selection program to support its pavement preservation program.

The research team for this project included Hannele Zubeck from the University of Alaska-Anchorage, Jenny Liu of the University of Alaska Fairbanks, and CP<sup>2</sup> Center's Gary Hicks and Ding Cheng. To support the research project, the Alaska DOT&PF formed a Technical Advisory Committee including Research Engineer Angela Parsons, State Pavement Management Engineer James Horn, State Pavement Engineer Steve Saboundjian, and Northern Region Maintenance District Superintendent Tom Williams.

## Alaska Pavement Preservation Database

In order to promote effective pavement preservation strategies in cold regions, an online pavement preservation database was created for Alaska DOT&PF by the research team. The purpose of the database is to:

- Promote use of effective pavement preservation techniques
- Keep track of the performance of pavement preservation projects
- Monitor pavement preservation innovation projects including interactive web mapping to display project locations
- Enhance collaboration and technical information transfer by using an internet based system to share information on preservation project activities amongst Alaskans involved in preserving pavements including local, state, military, and federal road and airport agencies, universities, private consultants, contractors and suppliers

- Centralize and archive important preservation project information in a database stored on a secured server
- Develop a pavement treatment selection program based on the information in the database including pavement condition, traffic, environmental conditions, and life cycle cost or cost effectiveness

Figure 1 shows the log-in page of the Alaska Pavement Preservation database. Anyone can view the projects stored in the database. However, only users that the Alaska DOT&PF sets up to be advanced users can add or edit their own projects in the system.

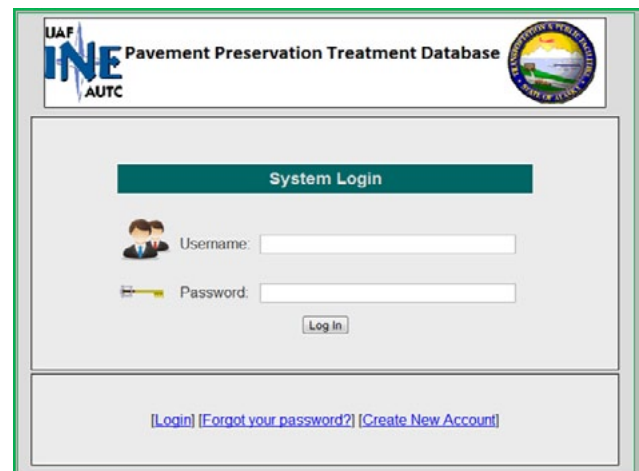


Figure 1. Login Page of the Alaska Pavement Preservation Treatment Database

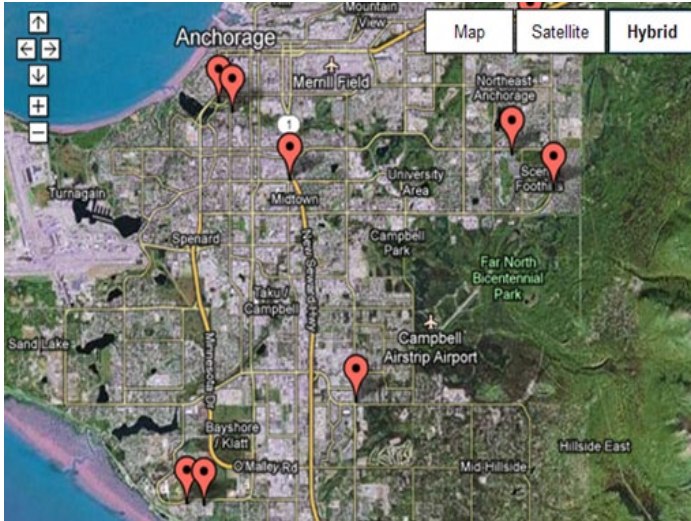
The project information includes existing pavement condition, location display, construction information, traffic volume, treatment type, jurisdiction, climate region, etc. Documents such as a construction or inspection reports or photos of a project site can also be uploaded and stored in the preservation database.

The location of a preservation treatment project can be displayed in a Google™ map embedded in the application. Users can find and identify project locations using satellite images as a map base, and even view street level photos of the project locale. Figure 2 illustrates an example of using the embedded Google™ map to display the pavement preservation project locations. By clicking on a project location's marker, users can see detailed information that has been entered into the system.

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Figure 2.  
Example  
of Using  
Customized  
Google™  
Map to  
Display the  
Project  
Locations



The preservation database helps users to monitor the performance of pavement preservation treatments by storing post-treatment inspection and condition information. As many post-treatment surveys as desired can be entered into the database for every project, and can include information on distresses such as fatigue cracking, rutting due to structure failure, rutting due to studded tires, and condition measurements including the IRI (International Roughness Index), and the Pavement Serviceability Rating (PSR). Rutting and IRI are collected annually (for the pavement management system) using an automated laser-based data collection vehicle. These surveys and annual condition data will help to determine the deterioration rates of pavements that have been treated and are expected to be very valuable in predicting the service life of the treatment under a variety of traffic and environmental conditions in Alaska.

#### *Integrated Treatment Strategy Selection Program*

The pavement preservation database also has a "treatment selection" module to help users choose suitable solutions based on project information and existing pavement distresses. There are many factors that are considered in the process of selecting an appropriate treatment for a pavement. These include pavement age and condition, traffic levels, expected future plans, as well as available funding and agency policy. Similar to the Caltrans Maintenance Technical Advisory Guide (MTAG), two strategy selection matrices were developed for Alaska. However, the treatment options include not only preventive preservation treatment, but also major rehabilitation and reconstruction strategies for Alaska.

The treatment selection module within the pavement preservation database is relatively easy to use. A basic analysis for treatment candidate pavements can be conducted using the following steps:

- Select the existing non-crack related distresses, traffic volume, and climate zone
- Select the existing crack related distresses (fatigue cracking, longitudinal cracking, and transverse cracking)
- Select the desired treatments for further analysis from the list of feasible treatments for the selected distresses, traffic, and climate
- Edit the treatment cost and expected life as necessary to match the local conditions. Calculate the equivalent annual life cycle cost (EAC) for each feasible treatment using the program
- Treatments are ranked based on the life cycle cost EAC from low to high. A report can be generated and printed

The system's advanced users can also select their own interest rate and analysis period and find out which combination of different treatments can be the most cost effective over the life of a roadway pavement.

#### *Summary*

As the result of about one year of study and collaboration, the pavement preservation database and online treatment selection program have been enhanced to include the following new features:

- Standardizes the types of pavement preservation strategies used in Alaska with the ability to add new pavement strategies to the list after approval by the AKDOT&PF
- Stores the pavement construction, traffic, climate, and other performance related information
- Contains an integrated Google™ Map function to show the location of the pavement preservation projects
- Stores multiple pavement condition survey results with supporting documents
- Conducts treatment strategy selection and life cycle cost analysis

The Database and Treatment Selection system represent the first version. A workshop on the use of this preservation treatment selection

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Ding Cheng (CP<sup>2</sup> Center), Clint Alder, and Angela Parsons (Alaska DOT) at the workshop in Anchorage

and database system was conducted in April 2012 in Anchorage. The workshop went very well and generated wide interest from Alaska DOT&PF engineers and managers. The system's functionality, cost, and treatment performance assumptions can be modified and refined as use of the system expands and more treatment performance data is collected.



Ding Cheng gave a presentation at the workshop

Caltrans has a similar pavement preservation database and strategy selection program. It was also developed by the CP<sup>2</sup> Center working with California Pavement Preservation Task Group (PTTG) and Caltrans engineers. The knowledge and experience obtained through the Alaska project will also help Caltrans improve its program.



## The Next Generation Concrete Surface Comes to California

By Larry Scofield (IGGA) and Craig Hennings (SWCPA)

2012 was a milestone year in California as Caltrans completed their seventh Next Generation Concrete Surface (NGCS) test section on PCC pavement. With the test sections constructed, Caltrans now has more NGCS test sections than any state in the country. Although the Minnesota DOT still owns title to the largest NGCS project ever constructed (104,000 sq. yds.), Caltrans now has constructed the most test sections.

In the March issue of CP<sup>2</sup> News, we reported on the development of the NGCS by Purdue University and how it relies on negative texture for macro texture and therefore provides a quieter PCC pavement surface than traditional textures that

rely on positive or upward texture. First installed on a freeway in Chicago, Illinois in 2007, the NGCS texture has only been around for 5 years. Figure 1 indicates a typical NGCS surface. As developed by



Figure 1. View of 5 Year old NGCS in Chicago Illinois

### Current and Future NGCS Sites Thru 2012

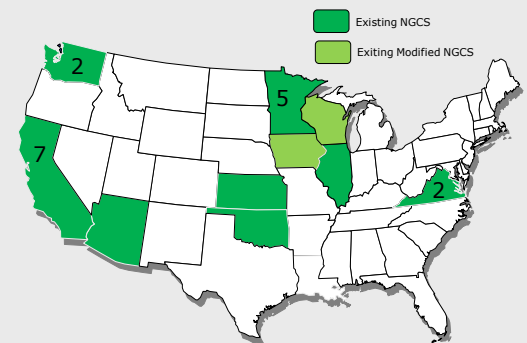


Figure 2. Location of NGCS Sections in US

Purdue University, the longitudinal grooves in the NGCS texture were spaced on 1/2 inch centers. To allow for construction variability, the IGGA specifications indicate spacing between 1/2 and 5/8 inches. During construction of the seven California sites, the spacing of the longitudinal grooves was different on selected projects; some with 1/2 inch spacing and some with 3/4 inch spacing. California's history with longitudinal tining and grooving placed on 3/4

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inch centers promoted the experimentation with the groove spacing. However, the 3/4 inch groove spacing is not consistent with the NGCS specifications that have been implemented nationwide.

The seven NGCS test sections were placed as part of Caltrans's Quiet Pavement Research managed by Mr. Bill Farnbach and Mr. Linus Motumah. The Quiet Pavement Research is being conducted by Dr. John Harvey and Mr. Irwin Guada of the Pavement Research Center (PRC) at UC Davis. The researchers are evaluating noise, texture, profile, and friction at these sites and many other textures which are part of the research effort.

Table 1 below, prepared by UC Davis, indicates the locations and evaluation areas for each of Caltrans's NGCS sites. The PRC has prepared a 3 year report on the concrete quiet pavement research effort which contains their test results for the NGCS surfaces. The draft report is currently under review.

**TABLE 1.**  
**Location of**  
**Caltrans' NGCS**  
**Test Sites**

EA	County	Route	Nearby Town	Project Limits	Grind & Groove Limits and Direction	Evaluation Limits
07760	San Diego	5	Solana Beach	PM R36.3 - R37.4	PM R36.3 - R37.4 Both Directions	PM35.8 - 37.9 Lanes 1 - 5, Both Directions
1F450	Sacramento	5	Sacramento, just south of US-50	1: PM 17.2 - 22.8 2: PM 24.2 - 24.8	PM 18.69 - 22.42 NB	PM20.0 - 21.5 Lanes 1 and 4, Both Directions
0F590	Sacramento	5	North of Thornton and Walnut Grove	PM 0.0 - 17.2	PM 1.04 - PM 3.14 NB	PM1.5 - 3.0 Lanes 1 and 2, Both Directions
2F040	Sacramento	80	Citrus Heights, east of Sacramento	PM 12.4 - 18.0	PM 12.79 to 17.56 EB PM 12.91 to 18.00 WB	PM13.0 - 14.0 Lanes 2 and 5, Both Directions
0A800	Sacramento	50	Fair Oaks, east of Sacramento	1: PM R2.6 - R5.4 2: PM R12.2 - R14.2	PM 12.8 - 14.2 WB	PM12.9 - 13.9 Lane 2 and 4, Both Directions
0V870	San Joaquin	99	Lodi	PM 29.0 - 30.8 NB	PM 29.0 to 30.8 NB	PM29.0 - 30.5 Lanes 1 and 2, Northbound
2F050	Yolo	113	Davis	PM R0.0 - R11.1	PM R0.20 to R1.50 NB PM R0.25 to R1.50 SB	PM0.50 - 2.50 Lanes 1 and 2, Both Directions

### *Caltrans Constructs the First "Buried Treasure" NGCS*

The NGCS project on State Route 113 in Davis represents the first NGCS "Buried Treasure" project ever. The term "buried treasure" refers to the removal of an existing hot mix asphalt (HMA) overlay which had been placed on a structurally sound PCC pavement. Route 113 had a thin HMA overlay placed over a sound PCC pavement. Since the cost of HMA overlays has continued to increase, the buried treasure concept revisits the previous decisions of overlaying a concrete for functional reasons. Instead, the HMA is removed through either a milling operation or a grinding operation and

the original concrete surface restored through diamond grinding and other concrete preservation strategies if necessary.

### *Measuring Quiet Pavements: Making sure everyone is on the same page*

One of the problems with measuring the impact of various textures on overall noise is how to measure or isolate the tire-pavement noise contribution to allow comparison of different pavement surfaces. Fortunately, in 1982 General Motors developed what is now called the On-Board Sound Intensity (OBSI) method. This method, standardized today as AASHTO TP-76, is the industry standard in the US.

The OBSI methodology was introduced to the highway community around 2002 by Dr. Paul Donovan of Illingworth and Rodkin, Inc. (I&R) working with Bruce Rymer of Caltrans. This was the first use of OBSI by a transportation agency in the US. Within a decade, this technology would become promulgated in

AASHTO specifications and has become the standard means for measuring tire-pavement interaction noise levels.

The OBSI equipment, shown in Figure 3, does not require a trailer like the European CPX method. Instead, a fixture is attached to the lug nuts of a vehicle as indicated. The test is conducted

at 60 mph which allows it to be used on Interstate highways without any issues.

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**Figure 3. UC Davis OBSI Test Equipment**

## OBSI Rodeo

Like any test method, noise measurements vary between operators and equipment. To ensure test results are within an acceptable range among testers, the PRC sponsored an OBSI Rodeo in October of 2012. Participants included the International Grooving and Grinding Association (IGGA), Illingworth and Rodkin, Inc. (I&R), and UC Davis PRC. The OBSI Rodeo consisted of weighing each of the vehicles, evaluating performance of the system components, and finally testing numerous field test sections and comparing the results. Dr. Paul Donovan, the co-inventor of the OBSI method while at GM, designed the Rodeo and analyzed the results under contract with the PRC. The Rodeo was a success and indicated that the three groups test results were consistent with an overall average difference of all sites of 0.9 dBA among testers. A report documenting the Rodeo is currently in preparation.

## IGGA OBSI Results

Annually, the IGGA attempts to conduct OBSI

evaluations on most if not all the NGCS sites constructed to date to provide a single “golden” evaluation using the same equipment and tire to minimize variability between test results. The data from these evaluations are then posted at [www.NGCS.info](http://www.NGCS.info) annually so the data is available at one source. In October, after the OBSI Rodeo, the IGGA tested the seven California NGCS sites and the results are indicated in Table 2. The reports on these sites have not been prepared at the time of this newsletter so the results of one site are still in question. The test results also have not been temperature-corrected, and some of the higher readings are attributable to cooler temperatures during the testing. For example, the Route 113 testing was conducted at 52 degrees in the early morning. If an NCHRP recommended temperature correction of 0.4 dBA per ten degrees Fahrenheit were applied to this data and corrected to a temperature of 70 degrees, the overall level would decrease to 99.9 dBA. Additionally, the impact of unsealed pavement joints is also not considered in these evaluations.

## Future Work

Based on the favorable results found with the test section, Caltrans is planning on adopting the NGCS specification and making it a permanent part of Section 42. This will allow Districts more options to smooth and quiet a pavement section while enjoying the long lasting benefits of rigid pavement.



Route	Nearby town	OBSI Level (dBA)
I-5	Solano Beach	102.0
I-5	Sacramento	104.2*
I-5	North of Thornton	101.8
I-80	Citrus Heights	101.8
I-50	Fair Oaks	101.8
99	Lodi	102.4
113	Davis	100.6

\*This site needs further investigation to ensure the results are accurate.

## GENERAL NEWS

## In-Place Recycling Conference A Big Success by Roger Smith, CP<sup>2</sup> Center

Over 125 people gathered at the Radisson Hotel in Ontario for 3 days of intense focus on the In-place Recycling (IR) of asphalt pavements. This conference was one of several that have been held nationwide. Attendees representing 12 state DOT's, various local agencies, and industry were treated to informative presentations on the latest IR technologies and to exhibitor displays. There was also a field trip to a local jobsite and to a demonstration area.

The Conference was presented through a partnering effort of FHWA, the National Center for Pavement Preservation (NCPPI), and the Asphalt Recycling and Reclaiming Association (ARRA).

Presentations from the Conference can be found at <http://www.pavementpreservation.org/conferences/regional-in-place-recycling-conferences/2012-workshop/>.

Keynote speaker for the Conference was Amarjeet Benipal, Caltrans' State Pavement Engineer, who noted that legislation (AB-32) requires California's greenhouse gas emissions to be brought down to 1990 levels, and that IR technologies can help them reach this goal. He also cited Caltrans' increased use of RAP (up to 40%), recycled asphalt shingles (RAS) and the growing popularity of warm mix asphalt (WMA) as other measures that will help meet this “green” goal.

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FHWA policies regarding IR were summarized by their theme, “Recycle First”, noting that recycling of a pavement should be a high priority “first strategy” employed by state DOT’s as long as pavement quality isn’t compromised. FHWA will be continuing their efforts to promote the use of IR strategies.

In addition to the very obvious benefits of conservation of materials and cost savings, many other benefits of IR were cited, including:

- reduction of greenhouse gas (CO<sub>2</sub>) emissions
- faster construction; less downtime; reduced traffic disruption
- elimination of haul trucks to and from the job
- preserving the original profile of the roadway
- ability to maintain access to adjacent businesses & residences

The Conference focused on three major forms of IR. Highlights from the discussions of each are presented below:

**1) Cold In-Place Recycling (CIR)** usually involves the cold milling of 2 – 4 inches of old pavement, re-crushing and sizing the material as needed, and mixing it with new asphalt emulsion binder – all done by a train of connected equipment. It’s usually capped with a chip seal or thin overlay, depending on traffic levels. Important points about CIR include:

- CIR usually provides a reduced initial cost and lower life-cycle cost.
- Contractors should be consulted early in the project – they’re the experts, and they want to work on the right projects for their technology to be successful!
- Nevada DOT has used CIR extensively for a savings of \$600 million
- Sonoma County reported a cost savings of 40-60% over straight overlays and greatly reduced carbon emissions.
- Caltrans has a new specification for CIR – a product of the PPTG.
- The amount of emulsion binder to be added ranges from 1.5 to 3.5 %.
- There’s still some confusion regarding emulsion binder options (e.g., recycling agents vs. polymer-modified emulsions vs. “engineered” emulsions)

**2) Hot In-Place Recycling (HIR)** involves pre-



### **Cold In-Place Recycling Project on Van Buren Ave. in Riverside**

heating the pavement, then scarifying it, adding an asphalt emulsion or liquid recycling agent, re-grading and rolling. Some processes also involve simultaneously adding a new HMA overlay or remixing and windrowing the surface material for lay-down by a paving machine. Points made at the Conference include:

- HIR equipment is new and improved from the old days. Indirect heating using propane produces much less smoke than earlier technologies, and can heat up to 3 inch deep and travel 35 ft/min.
- This process should be used where pavement structure is good, but surface defects exist.
- It’s used extensively around the Midwest.
- Oklahoma Turnpike Authority has done over 125 lane-miles of 2 inch HIR and found a 20% cost savings over a 2 inch mill & fill. The process was twice as fast as mill & fill, and has resulted in less cracking.
- Washington DOT has used it to correct rutting and raveling from studded tires.
- The City of Lancaster will be doing a demonstration project in the fall of 2012.

**3) Full-Depth Reclamation (FDR)** is a “deep fix” strategy used as an alternative to reconstruction. It requires a special “reclaimer” machine capable of deep-milling through the HMA layer into the base layers and mixing in a stabilizing binder such as asphalt emulsion, portland cement or fly ash. The hot foamed asphalt process can also be used for FDR. Important points from the Conference include:

- Today’s reclaimer machines can go up to

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- 20 inch deep and pulverize the material to 2 inch-minus size.
- FDR can be completed in half the time of full reconstruction, while preserving access to businesses and residences.
- The most common form of FDR nationwide uses asphalt emulsion stabilization.
- FDR is usually capped with a chip seal or thin HMA overlay, depending on traffic.
- Where cement is used, "microcracking" of the cured material is recommended prior to overlaying with HMA.
- A mix design guide addressing all the processes is being developed via AASHTO.

Another highlight of the Conference was



**FDR demonstration at PRS yard in Colton**

a field trip organized by Pavement Recycling Systems (PRS) of Riverside to two project sites: 1) an ongoing CIR job on Van Buren Blvd. in Riverside, and 2) their headquarters equipment yard in Colton for demonstrations of FDR, central plant recycling, chip seal and slurry seals done with RAP aggregate, as well as their new

"texture seal" process for adding fine aggregate to a fog seal.

One goal of the Conference was to identify agency "barriers" to use of IR. Several were cited:

- no local contractors
- agency unfamiliarity with the IR processes; fear of the unknown; limited expertise
- more education is needed – perhaps via state DOT conferences, etc.
- overly conservative pavement managers in agencies

- lack of standardized specs (e.g., Green Book) & testing criteria how to choose the right project & strategy
- iron (utilities) in the street
- IR contractor should be the general contractor, rather than a sub, if possible
- turnover of agency employees and loss of expertise

Overall, the Conference was considered a big success and provided a needed impetus for the further use of IR strategies in pavement maintenance. Recurring messages throughout the Conference were:

- Shrinking budgets will focus more attention on cost saving methods such as IR.
- IR technology is proven and available in most areas – agencies need to use it!
- FHWA will expect agencies to consider IR strategies; federal funding is available via MAP-21
- Agencies should partner with knowledgeable contractors, especially when agencies do not have in-house expertise for IR technologies.

Several resources are available for information and support on IR technologies:

- Pavement Recycling & Reclaiming Center (PRRC) at Pomona State University (<http://prrcenter.org/Home/About>)
- California Pavement Preservation Center (CP<sup>2</sup>C), Chico State University (<http://www.csuchico.edu/cp2c/>)
- ARRA expert speakers (<http://www.arry.org/>)
- "Basic Asphalt recycling Manual" (BARM) available from ARRA
- NHI 131050 Training Classes (both on-line and classroom type) (<https://www.nhi.fhwa.dot.gov/training/list>)
- National Center For Pavement Preservation (NCPPI) (<http://www.pavementpreservation.org/>)



## APWA Conference Held In Richmond By Roger Smith, CP<sup>2</sup> Center

The Northern California Chapter of the American Public Works Association (APWA) held their big "2012 Public Works Conference" on November 7-8 in Richmond, California.

APWA Education Director Scott Dmytrow of Telfer Oil welcomed more than 300 attendees from many public agencies and over 30 private sector firms and exhibitors, who helped sponsor the event.

The topics of discussion were many and varied

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relating to public works, with one morning session devoted entirely to pavement maintenance. It included presentations on pavement repair and maintenance by Roger Smith (CP<sup>2</sup> Center) and Blair Barnhardt (IPMA), and on cold in-place pavement recycling by Jim Emerson (PRS).

Of particular interest was a panel discussion on providing proper pavement maintenance in the face of shrinking budgets. Many good ideas for operating more efficiently to free-up funds to maintain pavements were discussed. Here are some of those ideas:

- Use a Pavement Management System (e.g. "Street Saver" by MTC) with trained people
- Perform crack sealing and chip sealing "in-house" using agency personnel
- Use of chip seal over paving fabric and

scrub seals (in lieu of HMA overlays)

- Form co-ops to purchase and share specialty equipment
- Rent certain equipment instead of purchasing
- Partner with vendors such as sweeping and trucking companies
- Reduce frequency of trash (not garbage) pick-up
- Mothball some vehicles & forego installing expensive diesel particulate filters
- Document the knowledge of experienced employees before they retire

Watch for special events put on by other APWA Chapters around California, and mark your calendars for next year's Northern California Conference, which will be held again in Richmond on November 6-7, 2013.



## AR 2012 International Conference By Ding Cheng, Director of CP<sup>2</sup> Center

The 5th International Conference on Asphalt Rubber "Road of the Future" was held in Munich, Germany on October 23-26, 2012. Over 250 people representing 29 countries attended this conference which produced a nice proceeding and DVD with a total 58 peer reviewed conference papers. The conference summarized more than 45 years of history of research and practice on specification, performance, and properties of asphalt rubber binders and provided valuable past and current information for researchers and engineers worldwide. More importantly, it provided some innovative ideas and promising future trends on using CRM in asphalt pavement. The following are some key items discussed at the conference:

### *Performance based PG grading of asphalt rubber binder*

Historically, Asphalt Rubber has been specified using a recipe approach including CRM gradation, blending temperature, reaction time period, and monitoring the rotational viscosities of asphalt rubber binders. With the adoption of Superpave, almost any type of asphalt binders including polymer modified binder and terminal blend rubberized asphalts are utilizing performance based PG grading system. With the development of Cup and Bob geometry for the DSR, the

PG grading specification of Asphalt Rubber with finer CRM particle sizes has been developed by researchers. The PG grading specification for coarser CRM particles used in California and Arizona is moving forward as well. This will be a big step forward to rule out the adverse properties of poor combination of base binder and CRM and improve a favorable chemistry matching and reaction of different sources of asphalt binders and tire rubber particles.

### *Asphalt Rubber with warm mix applications*

Although there are many benefits of using asphalt rubber, there are some undesirable factors such as warm weather requirements, high production and compaction temperatures, and emissions and odors. With proper warm mix technologies, researchers have shown growing benefits of utilizing



**AR2012**  
**Conference Venue in**  
**Westin Grand Hotel**  
**in Munich, Germany**

warm mix additive into asphalt rubber applications including cooler night paving, long haul distance, compaction aid, and emission reductions, while maintaining similar performances as the regular asphalt rubber mixes.

#### *Pelletized asphalt rubber particles*

Several innovative products have been developed including Reacted and Activated Rubber



Ding Cheng  
CP<sup>2</sup> Center,  
Cao Rongji  
of Jiangsu  
Transportation  
Research  
Institute, and  
Jorge Sousa  
conference  
chairman (Left  
to Right) at  
the AR2012  
Conference

which contains neat soft binder, fine crumb rubber, and an Activated Mineral Binder Stabilizer at optimized proportions. These pellets can be added proportionally into hot mix to produce rubberized hot mix asphalt at regular drum or batch hot mix asphalt plants. If these new technologies can achieve the similar performance as regular asphalt

rubber production procedure, it will greatly increase the amount of applications of using recycled tire rubber into pavement without additional modification and equipment costs to existing hot mix plants.

This conference also demonstrated the continuing leading effort, in terms of research and practice in California (especially by Caltrans), to promote the sustainable and green technologies of using tire rubber in pavement engineering. The following are the list of papers based on California's research experiences:

- Seven Year Itch – Evaluation of Caltrans' Full Scale Experiment on Asphalt Rubber Modified Pavements, by Sri Holikatti, Haiping Zhou, and Peter Vacura (Caltrans)
- Comparisons of Rubberized Asphalt

Binders: Asphalt-Rubber and Terminal Blend, by Shakir Shatnawi (Shatec LLC)

- Life-Cycle Cost Analysis of Flexible Pavement Systems Rehabilitated with the Use of Asphalt Rubber Interlayers, by Shakir Shatnawi
- Superior Aging Characteristics of Asphalt Rubber, by Shakir Shatnawi
- Using Statistical Analysis to Compare Life Cycle Costs of Rubberized Hot Mix Asphalt with Conventional Hot Mix, by DingXin Cheng and Gary Hicks (CP<sup>2</sup> Center) and George Way
- Using Warm Mix Technologies in Rubberized Asphalt Pavements, by DingXin Cheng, Lerosé Lane, and Gary Hicks (CP<sup>2</sup> Center)
- Research Findings on the Use of Rubberized Warm Mix Asphalt in California, by David Jones, Rongzong Wu (UC Davis), Cathrina Barros, and Joseph Peterson (Caltrans)
- Development and Application of the Asphalt Rubber Three Layer Cape Seal Pavement Preservation System, by Jack Van Kirk (Basic Resources)
- Asphalt Rubber Chip Seal Evaluation and Comparison of Other Binder Types, by Shawn Rizzutto (Caltrans), DingXin Cheng, Lerosé Lane, and Gary Hicks (CP<sup>2</sup> Center).

It is our responsibility to effectively utilize the beneficial engineering properties of asphalt rubber, to produce sustainable and high performance of rubber modified asphalt pavement, and to create environmentally friendly practices for our society.



## Rubber Recycling Symposium Held in Toronto Canada

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

Over 200 attendees from North America, Europe, and Asia attended the Rubber Recycling Symposium held in Toronto on October 17-19, 2012. Dr. Gary Hicks of the Center was one of the speakers on the use of crumb rubber in asphalt roads. Other topics covered included:

- Global view and incentives for recycling tires
- New technologies for the use of recycled tires

- Rubber recycling Markets-What is hot and what is not
- Rubber manufacturing-the case for replacement
- R & D funding-How the producers handle it
- Off the road tires-Opportunity to collaborate
- Seeking equilibrium between social objectives and economic realities
- Future outlooks

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Figure 1 Left to right: Doug Carlson, Liberty Tire; Dr. Susan Tighe, University of Waterloo; Chris Raymond, MTO; Gary Hicks, CP2C; Seyed Tabib, MTO; and Andrew Horsman, Ontario Tire Stewardship



Those participating in the rubberized asphalt session are shown in Figure 1. Overall, the program was a great success. All the presentations can be found on the website of the Rubber Association of Canada (<http://www.rubberassociation.ca/rubberroom/Home/Home.html>)



## FHWA Update By Steve Healow, FHWA

**M**oving Ahead for Progress in the 21st Century (MAP-21), the new 2-year highway law, took effect October 1 and will affect the way state DOT's build, maintain, and manage highways by transitioning to a performance and outcome-based program. This article will focus on five sections of MAP-21.

*Section 1104 National Highway System (NHS)* redefined the NHS and expanded mileage by 34%. In California, prior to MAP-21 only one mile of one local arterial was on the NHS; now over 5,000 miles of local arterials are in the NHS.

*Section 1106 National Highway Performance Program* requires that each State prepare a risk-based, performance-based asset management plan for at least pavements and bridges on the National Highway System (NHS). As a reminder the NHS consists of all interstate, intermodal connectors, access roads to airports, seaports, transit facilities, and military installations. The asset management plans will establish performance targets for condition and performance.

Section 1106 further directs the Secretary of Transportation to issue a regulation within 18 months (i.e. not later than April 1, 2014), after consultation with the States, which will establish the process to develop the State asset management plans. As a minimum the plans will include:

- list and description of the condition of pavement and bridge assets on the NHS
- asset management objectives and measures
- performance gap identification
- lifecycle cost and risk management analysis
- financial plan, and
- investment strategies

States are encouraged to include "...all infrastructure assets within the right-of-way corridor..." in their plan, although only pavements and bridge assets are mandatory at this time.

*Section 1203 National goals and performance management measures* is intended to "...provide a means to the most efficient investment of Federal transportation funds by refocusing on national transportation goals...and improving project decision-making through performance-based planning and programming..."

The national goals listed in this section are safety, infrastructure condition, system reliability, freight movement, environmental sustainability, and accelerated project delivery. The goal of this section is to encourage investing in projects that collectively will make progress toward the aforementioned national goals.

Another important provision in Section 1203 is the National Highway Performance Program, wherein the Secretary of Transportation, in consultation with the States, is directed to establish minimum standards for States to use in developing and operating management systems for bridges and pavements. The new standards will include standard measures for assessing the condition and performance of pavement and bridges on the NHS.

Section 1304 "Innovative Project Delivery Methods" may be important for some agencies because it allows up to 100% Federal-aid funding on projects which improve safety, reduce congestion, accelerate project delivery or showcase specific innovative technologies. Examples of the innovative technologies include in-place recycling, intelligent compaction, prefabricated bridge elements and incentive payments for early completion. It's important to note there are no designated funds set aside for this Section.

Section 1507 "Maintenance" is worth reading for two reasons: (1) it gives a legal definition

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of pavement preservation, and (2) dozens of pavement preservation advocates worked very hard to get the definition into MAP-21.

What happens next?

- In consultation with State DOT's, FHWA will establish the process to develop the State asset management plans no later than April 1, 2014 through the standard rulemaking process, including public comments.
- Individual State reports on NHS condition and performance are required no later than October 1, 2016 and every two years thereafter. The reports will describe progress in achieving State performance targets and effectiveness of the State investment strategies.
- One impending crisis which the congress did not address in MAP-21 is the long-

term financial viability of the highway-trust fund; thus the 113th congress must deal with a transportation fiscal cliff, a dubious gift from the 112th congress. According to the congressional budget office the highway trust fund will be insolvent by 2015.

In conclusion: MAP-21 has altered the Federal-aid highway program in that it is now performance-based and advocates a strategic approach using system information to make investment and policy decisions to achieve national performance goals. Each State is required to develop a risk-based asset management plan to improve or preserve the condition of the assets and the performance of the NHS. In this sense risk is the opposite of reliability and certainty. MAP-21 includes provisions to expand the NHS to include more principal arterials.



## Foundation For Pavement Preservation (FP<sup>2</sup>) Update

By Jim Moulthrop, Executive Director

If you didn't make it to Nashville for the National Pavement Preservation Conference, check out the Winter Edition of the Pavement Preservation Journal for all the details. An electronic edition is available at [www.fp2.org](http://www.fp2.org).

If you don't receive the printed edition and would like to receive one, just drop a note to [jimmoulthrop@gmail.com](mailto:jimmoulthrop@gmail.com) and you will be added to the mailing list.

With the Presidential election behind us, Congress will be meeting to make Committee assignments in both the House and Senate which may impact future legislation. MAP-21 was signed into law on July 6, but it has a 27 month life span so it is feasible that work on a new bill will begin soon. Since preservation was included in the "policy" end of MAP-21, we hope that no changes will occur in future legislation, but FP<sup>2</sup> is prepared to continue or relationships in Washington to support our cause.

FHWA is in the process of deciphering the MAP-21 legislation and will issue rulemaking for public comment soon, and we plan to be engaged in those activities.

Research work at the National Center for Asphalt Technology (NCAT), in which FP<sup>2</sup> is a full funding partner, is underway. All the preservation treatments on the "off-track"

study section (on Lee County Road 159) have been completed, and performance information is being gathered as truck loading to and from the HMA plant and quarry continues. The first meeting of the seven AASHTO states and FP<sup>2</sup> has been scheduled at NCAT on December 17-18 when the NCAT test track staff will brief the attendees on the plans for the application of preservation treatments on the test track.

The annual Transportation Research Board (TRB) meeting in Washington, DC is just around the corner (January 13-17, 2013). Transportation professionals from around the world will meet to discuss progress or completion of projects that will impact all modes of current and future transportation projects. Both the Pavement Maintenance and Pavement Preservation Committees will be meeting and a number of sessions involving both of these committees are scheduled.

Check the TRB web site at [www.trb.org](http://www.trb.org) for a listing of all meetings. FP<sup>2</sup> will once again be present in the exhibit area, so stop by and say hello - or better yet, come by our room, suite 9021 in the Marriott Wardman Park

Hotel, on Monday and Tuesday, January 14-15 in the evening to enjoy friendship with your pavement preservation colleagues.





## CP<sup>2</sup> Center Update

By Ding Cheng, Director of CP<sup>2</sup> Center

The purpose of the California Pavement Preservation (CP<sup>2</sup>) Center is to provide pavement preservation services to public agencies and industry, and coordinate our expertise and research efforts with teaching of Chico State University Civil Engineering students. There's a lot happening, so here's some news regarding to our Center.

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

The CP<sup>2</sup> Center is always looking to expand its capabilities. Of course, this takes additional support and funding. We currently have a Patrons Program that we're working to expand and formalize so that we might build more capability for research, education and providing public agencies with support services for their pavement preservation programs. We'll be hosting a one day open house and meeting for our Patrons at the CP<sup>2</sup> Center on March 18, 2013. If you're interested in becoming a Patron of the CP<sup>2</sup> Center, you won't want to miss this event. Please contact us at [dxcheng@csuchico.edu](mailto:dxcheng@csuchico.edu) or [cp2c@csuchico.edu](mailto:cp2c@csuchico.edu), and we'll send you more information. We appreciate your support!



Michael Fielderman (left) and Lance Patchin (right) of CP<sup>2</sup> Center working on Rice density test

### *New Research Projects*

We have just initiated several new projects from both state and local agencies. Some of the projects are briefly discussed below:

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

The CP<sup>2</sup> Center was recently given a new task order from Caltrans to update its life-cycle cost analysis (LCCA) Manual and online training material. Caltrans has been working with the Pavement Research Center (UCPRC) to upgrade the Caltrans life-cycle cost analysis program, "Realcost", from version 2.2 to version 2.5. The upgrade is almost complete. The Center will support Caltrans with the following major tasks: (a) reviewing the "Realcost 2.5CA" program beta version, (b) revising the Caltrans LCCA Manual to comply with the new version 2.5, (c) developing examples for typical Caltrans LCCA project scenarios, and (d) upgrading the existing Caltrans online training classes on LCCA. The Center staff will work closely with Caltrans engineers and UCPRC to make the LCCA procedure easier and clearer for Caltrans engineers to use in their pavement

planning and design work.

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

Currently, California generates more than 40 million reuse or waste tires per year. The Department of Resources, Recycling and Recovery (CalRecycle) has a goal to increase the processing of CA waste tires into more value-added, tire-derived products in California. CalRecycle promotes the use of waste tires in various asphalt pavement strategies as part of their ongoing efforts to divert waste tires from landfills in California.

But long-term performance modeling and the development of performance curves for rubberized asphalt pavements are needed to more accurately predict their future performance and to enable valid life cycle cost analysis. These analytical tools are not available at the present time. The CP<sup>2</sup> Center will work with local agencies in the San Francisco Bay Area, the Los Angeles Basin, and the Central Valley to develop performance models for use by Local Agencies. The Center staff will also work with Caltrans to model the performance of Caltrans rubberized asphalt pavements on state highways.

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

The Metropolitan Transportation Commission (MTC) is the Bay Area's transportation planning agency, with over 100 agencies using its "Street Saver" pavement management system. MTC wants to enhance its quality assurance program for their contractors doing pavement condition evaluations for input to their "Street Saver" software. To help accomplish this, MTC has contracted with the CP<sup>2</sup> Center to provide the following major services:

- Task 1- Administer an Inspector Certification Program
- Task 2- Conduct audits of MTC contractors' Quality Control Plans
- Task 3- Verify data collected by their contractors



Dr. Roger Smith of Texas A&M University provided training at the MTC User's Week

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**Ding Cheng, CP<sup>2</sup>C and Sallie Houston, VSS**

In October 2012, Sui Tan of MTC arranged training for the CP<sup>2</sup> Center staff during the MTC's Fall User Week. Dr. Roger E. Smith of Texas A&M University and a consultant to MTC, provided field training on how to determine Pavement Condition Index (PCI) in accordance with the Street Saver system. Dr. Smith provided field instruction to the attendees.

### Lab Updates

The CP<sup>2</sup> Center's lab has been very busy. Center staff and students are working to perform tests including performance grading (PG) tests for asphalt rubber binders, Hamburg wheel track testing of asphalt mixes, and some direct shear tests of a thin



**Dr. Hans Ho of Telfer Oil**

bonded wearing courses on HMA.

### Transportation Engineering Class Guest Lectures

We have had several guest lecturers during the fall semester in our CIVL 441 Transportation Engineering class.

Sui Tan of MTC lectured on Pavement Management System. Dr. Hans Ho of Telfer Oil made a presentation on Superpave PG grading binder. Joe Peterson of Caltrans gave a lecture on "FHWA's Every Day Counts Initiative" and encouraged students to think outside the box to be good engineers. Sallie Houston, Technical Manager of VSS Emultech lectured on asphalt emulsions.



**Joe Peterson (Caltrans), Brian Winter and Brandon Fraser (CP<sup>2</sup>C) from left to right**



## Mark Your Calendar (Coming Events)

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

- December 19, Bakersfield
- January 9, Los Angeles
- January 23, San Diego

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

The annual 2013 Pavement Preservation Workshop will be held February 5-7 at the Marriot Mission Valley in San Diego. This popular event, produced by the California Chip Seal Association, is geared to pavement maintenance and preservation topics and offers an excellent program for hearing the latest ideas from industry and agency experts. For more in-

formation visit: <http://www.chipseal.org/>

The National Pavement Expo - January 24-26 in Nashville - brings together vendors and contractors who make their living from paving, sealcoating, striping, sweeping, crack repair, and pavement repair. <http://nationalpavementexpo.com/>

Other upcoming national events include:

AEMA / ARRA/ ISSA Meeting – February 19-23 in Indian Wells, CA <http://www.slurry.org/>

Transportation Research Board (TRB) January 13-17 in Wash. D.C. <http://www.trb.org/AnnualMeeting2013/AnnualMeeting2013.aspx>

World of Concrete – February 4-8 in Las Vegas, NV. <http://www.worldofconcrete.com/attendee/show-information.aspx>

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

Caltrans established the California Pavement Preservation (CP<sup>2</sup> Center) CSU, Chico in July 2006, and fully funded the Center in January 2007. Dr. DingXin Cheng is the current Director of the Center.

The purpose of the Center is to provide pavement preservation support services to Caltrans and other public agencies, and to industry. Unique services include developing educational programs in pavement preservation, providing training and staff development opportunities, providing needed technical assistance to public agencies and industry, and managing/conducting research and outreach services, such as this newsletter.

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

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