CP² Center News

Newsletter of the California Pavement Preservation Center

No. 21 March 2012

Pavement preservation workshop a big success

By Roger D. Smith, CP² Center

The California Chip Seal Association (CCSA) celebrated its 25-Year Anniversary at its annual Pavement Preservation Workshop, that many said was the "best yet." More than 200 pavement maintenance people representing local agencies, Caltrans, contractors, and material vendors packed the Holiday Inn in Sacramento on February 9–10 for this popular event.

CCSA booth at 2012 workshop

CCSA organized the event around vendor displays and a line-up of excellent speakers, and even included break-out sessions with demonstrations of emulsion and aggregate sampling and testing. Some of the speaker highlights are presented below, and copies of their PowerPoint presentations are available on the CCSA website www.chipseal.org.

Keynote Speaker was Larry Galehouse of the National Center for Pavement Preservation (NCPP) in Lansing, Michigan. He cited a 2010 survey of 41 states which found:

- Chip seals seem to be the most trusted method of pavement preservation (P2).
- 70% still have no formal P2 guidelines.
- 50% have no QA program for P2.
- 75% need more training even on the basics.
- pavements fail "functionally" before they fail structurally.
- P2 is misused on roads "too far gone."
- Performance-based rationale for P2 is needed.

He recommended an excellent video on P2 available from the Foundation for Pavement Preservation (FP²) at www.fp2.org

Fog Seals (John Fox, Caltrans - Bishop, Calif.)

John cited the expanding use of fog seals – both conventional and rejuvenating (PMRE) types – by Caltrans in the District 9 (Bishop) area to help seal out water, or possibly to arrest raveling. They also use them on older (>3 yr.) chip seals and on OGFC surfaces. Here are his recommendations:

- Surface must have enough texture or "openness" to accept a fog seal without becoming slick and a skid hazard to higher speed traffic.
- Use the simple "ring test" to come up with a starting point application rate – usually in the neighborhood of 0.10 gal/sy of diluted (1:1) emulsion.

Continued, next page

In this issue

- Do a test section at the start of each job to get visual verification of the best shot rate.
- In hotter weather (>90F) the old pavement surface should be pre-wetted.
- Curing can be anywhere from 15 minutes to 2 hours depending on weather and product.
- Tracking by tires can usually be controlled by applying either sand or a light water spray (after curing).
- They also do fog seals at night, down to 50F, using special emulsions formulated by their emulsion suppliers.
- Striping can usual be done the same day as the fog sealing, and some rejuvenating fog seals may not need restriping, depending on the brand.
- Most rejuvinating seals require a light sanding, but some fog seals may not need it.

Chip Seals (Jason Lampley - ISS) and Mark Bertsch (Intermountain Slurry)

These experienced contractors shared numerous tips for successful chip seals, including:

- PMCRS2h is the most common emulsion for chip sealing in California; it should only be used between 80°F and 110°F ambient temp.
- Rejuvenating emulsions can be used at lower temps down to 50°F pavement temp (daytime only) and can also help overcome dusty chips.
- Haul trucks' wheels provide initial rolling of the chips, so trucks should be staggered in the lane for better coverage.
- Sweeping can often be started at two hours and water spray can help control dust during the sweep.
- For hot applied chip seals, asphalt rubber and PG76-22TR are the workhorse binders, always using preheated, pre-coated chips and three roller passes. Sweeping can often be done after only 15 minutes. They've had good success placing these hot chip seals over badly cracked pavements, as long as the underlying structure is sound.

Slurry and Microsurfacing (Mike Marchini, CPM, and Jon James, VSS)

Mike and Jon gave an excellent presentation overviewing measures to promote quality slurry seals and microsurfacing. Some important points they stressed were:

- Mix designs accepted via Certificate of Compliance should be for the same material sources (aggregate and emulsion) that are being used on the current work. When material sources change, a new mix design should be done.
- Calibration of slurry machines should be done at least every six months even if the material sources remain unchanged. Otherwise, calibrate anytime material sources change. Calibration factor should be determined in "lbs/revolution" using the onboard counter.
- Calculate the application rate regularly: rate (lb/s.y.) = (lbs/rev) x (# of revs) ÷ (s.y. covered).
- On bigger jobs, a test strip should be done using all machines involved, including rollers, if applicable.
- Rolling (rubber tired) is recommended in high stress areas with potential for scuffing under traffic (e,g, parking lots, cul de sacs). Rolling should be done before slurry fully cures.

Cape Seals (Doug Ford, Pavement Coatings, Inc.)

Doug discussed several tips for quality cape sealing, including:

- Consider using cape sealing over nonstructural alligator cracking. It will perform better than just a chip seal or slurry seal alone. A 10 year life is not uncommon.
- Avoid cape seals (and chip seals) in high stress areas with potential for scuffing under traffic.
- Edge grinding (key cuts) should only be done if necessary to bring the old pavement surface flush with the gutter elevation, no deeper.
- After applying the chip seal, wait 48 hours to apply the slurry. This will give traffic an opportunity to roll and imbed the chips.

Pavement Management Systems (Sui Tan, MTC; Ding Cheng, CP^2; Peter Vacura, Caltrans)

Ding Cheng at the CP^2 booth

Three engineers well versed in the field of Pavement Management Systems (PMS) shared their views on the important science of Pavement Management.

Sui Tan, Manager of Metropolitan Transportation Commission's "StreetSaver" program stated that al 109 public agencies in the Bay Area use the StreetSaver PMS program to manage some 42,000 lane miles of pavement. With a replacement value of $50 billion, preserving this asset is an all important job for agencies. For the past 10 years the average Pavement Condition Index (PCI) in the Bay Area has been 66 (out of 100) with their long term goal being an average of 75. MTC continues to offer excellent support for users of their PMS program, including quarterly user meetings and training at their headquarters in Oakland, California.

Ding Cheng, Director of the Pavement Preservation (CP^2) Center described how pavement preservation strategies can be incorporated into pavement

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Aggregate testing demo by Greg Wilkinson (Granite Rock Co.)

management. He also announced the new release of CP^2 software for guiding the strategy selection process. This software is based on decision guidelines in the Caltrans MTAG manual chapter on Strategy Selection.

Peter Vacura of Caltrans overviewed Caltrans' plans to incorporate pavement preservation into its PMS. Caltrans currently has a contract with Fugro Engineering to do automated condition surveys of the California highway network.

Innovative new products (Hans Ho, Telfer Oil Co.)

Hans Ho of Telfer Oil Co. gave an overview of newer products and technologies being evaluated for use in pavement maintenance, including:

- "Warm" asphalt rubber chip seals – This technology uses WMA additives in asphalt rubber binders to reduce the temperatures of the sprayed binder from 400°F to around 325°F. This would reduce odors and emissions and would possibly eliminate the need for exhaust hoods and filters mounted on the distributor trucks.
- WMA made using terminal blended rubber binders (e.g. PG76-22TR) with common warm mix additives.
- Fiberized mat technology, which involves sandwiching fiberglass fibers between two sprayed layers of modified emulsion, all applied by a single pass of a special distributor truck. This composite binder layer can then receive a chip application or an HMA overlay. The ultimate goal is waterproofing and crack resistance.
- Rubberized emulsion aggregate slurry (REAS) is a specialty slurry mix incorporating ground tire rubber and aggregate made at a central plant.
- A special CQS-1hTR slurry emulsion made by emulsifying (with water) a hot asphalt rubber binder.
- Chip sealing over a fiberglass mat (similar to chip sealing over paving fabric).
- Fiber reinforced microsurfacing.

CCSA awards

A highlight of the Conference was presentation of a Lifetime Achievement Award to Gordon Rayner of California Pavement Maintenance (CPM) for his many years of service to the pavement maintenance industry and to the CCSA. Quality Awards were also given to various projects constructed throughout California during 2011.

Gordon Rayner, recipient of the Lifetime Achievement Award by CCSA

All in all, the conference was a worthwhile event, and the California Chip Seal Association should be commended. Through informative presentations and one-on-one discussions with exhibitors, one can stay abreast of the latest thinking in pavement maintenance technology. Be sure to attend next year's event, likely to be held in Southern California.

ASPHALT PAVEMENT NEWS

Caltrans uses RAP scrub seal on I-10

By Phil Vandermost, Western Emulsions

Interstate 10 is a heavily used route facilitating the movement of goods from the ports of Long Beach and Los Angeles to the rest of the southern United States. This interstate has seen dramatic increases in vehicle traffic during the past three decades, yet for the last several years there have been funding shortfalls that have created major challenges for the professionals in Caltrans' San Bernardino District (District 8), the largest of the 12 statewide Caltrans Districts.

Historically, the approach to treating the deteriorating pavement is to crack seal and fill potholes using cold-mix asphalt. However, these treatments are labor intensive and the sections of road requiring attention have increased exponentially.

Over the past several years, Caltrans' John Hubbs chose to address these challenges by developing a rapid crack-fill solution that would seal not only the severe and most visible pavement cracks, but the entire roadway surface to prevent moisture from damaging the road base. He began employing innovative products such as engineered emulsions that possess rejuvenating qualities to seal cracks and restore the pavement. These special emulsions

Caltrans' scrub sealapplication using RAP on I-10

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successfully combine an emulsified polymer-modified asphalt with a rejuvenating agent.

For several years, Mr. Hubbs' employed a scrub seal treatment on pavements exhibiting moderate distress and cracking. Engineered emulsion was used as the binder material for an application of 3/8" black volcanic cinders. He pursued the idea of using recycled asphalt pavement (RAP) millings as a less costly chip aggregate for the scrub seal. The RAP was generated by pavement rehabilitation work nearby, and Mr. Hubbs estimates that this process will save Caltrans enough money to do 10 times the number of lane miles that could be afforded previously with the District's materials budget. The project described below won the Innovative Project Award at last year's California Chip Seal Association Conference.

A recent mill and HMA overlay project on Interstate 10 in Riverside County had produced a stockpile of approximately 300,000 tons of RAP millings. Rather than pay for this material to be hauled off and recycled as a low-cost base material, Mr. Hubbs discovered that the RAP could be converted on-site to a high-value product that met the State's chip specification. Caltrans' innovations resulted in the agency saving the cost of purchasing new aggregate, but also allowed Caltrans to realize a significant hidden value of the stockpiled material.

"The RAP stockpile, which some would classify as waste or, at best base material, actually contained about 5% residual asphalt content, which means that we were sitting on approximately $7,500,000 worth of asphalt liquid at today's rack prices," said Hubbs. "The relatively high residual asphalt content in turn allowed us to reduce the amount of emulsion needed in our mix design, another savings that made our dollars go farther." By partnering on these solutions with industry, Caltrans is using this new technology to retain the fullest value of its materials and keep the valuable asphalt binder (as high as $500/ton in 2010) out of landfills and on the road where it belongs.

Working with Main Street Materials, Pavement Recycling Systems, and Western Emulsions, Caltrans utilized the stockpile to develop two products a 5/16 – 3/8" RAP aggregate *chip* that met state specifications, and a RAP *slurry* product utilizing the smaller material generated through the crushing and screening operation.

RAP scrub seal being applied on I-10

Pavement Recycling Systems brought a portable crushing and screening unit to the project site, engineered the project design, and conducted materials processing and testing. Caltrans operations crews, run by Supervisor Cliff Eastin, applied the aggregate to the highway following Main Street Materials' application of a PASS® CR engineered emulsion product. The team's first trial used a 3/8" aggregate, but had the best performance and success with a 5/16" stone. The key to maintaining workability of the RAP chip was keeping the stockpiled material moist and cool using water.

The project covered 35 miles along I-10, one of the most heavily traveled roadways in the nation. The scrub seal was a single pass chip application followed by sweeping, and the RAP chip proved to be very compatible with engineered emulsion binder. It set up quickly allowing traffic to return to the highway within four hours. No sanding or blotter material was needed.

The economics of the project were very favorable, with the aggregate material processed and applied at total cost of $500,000 over the 35 miles of application. In fact, Hubbs reported that the agency budget for pothole patching on the I-10 exceeded the per-lane mile costs of using the scrub seal treatment.

Caltrans uses WMA with Evotherm® for cold weather paving

By Scott Dmytrow, Telfer Oil Co.

When Caltrans needed an emergency asphalt paving repair on I-5 in January 2012 in Redding, they called on Tullis, Inc. of Redding. Tullis called Telfer Oil Company for information about using warm mix asphalt (WMA) additive to possibly help make this cold weather paving project successful.

On the nights of January 12-13, 2012, Tullis Inc. paved I-5 going northbound through Redding with just over 3300 tons of WMA using Meadwestvaco's Evotherm additive as a placement and workability aid. Conventional mix wasn't an option due to the 35°F air temperatures and 40°F pavement temperatures.

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WMA with Evotherm aids cold weather paving on I-5

The mix was a gap-graded PG 64-28PM with 15% RAP produced by Northstate Asphalt, a Tullis company. Telfer Oil Company supplied the Evotherm® product and equipment to Northstate's hot mix plant. Evotherm is easily metered and injected into the asphalt feed line at the hot plant using a skid mounted controller unit.

One of the challenges on this job was the short time frame from notice of job to start of the repair work. Tullis and Telfer found out about the job on Friday, January 6th, about 3:00 PM. By Monday, the Evotherm equipment and material was on site and by Tuesday it had been approved by Caltrans as meeting all the necessary MPQP requirements. Milling commenced Tuesday night and paving started Thursday.

The mix was produced between 285°F – 295°F. Temperatures behind the screed and during rolling were as low 220°F with compaction being achieved by 190°F. Evotherm additive allowed the mix to be paved in cooler temperatures with greater workability for spreading and compaction.

On the jobsite it was noted that by using WMA nothing had changed in the paving procedures except for the fact that Tullis was able to pave in cool weather conditions that normally would have been considered unacceptable by the state.

Caltrans and Tullis are very happy with the final product.

Caltrans moving to Superpave mix design & specifications

By Roger Smith, CP^2 Center

Caltrans is moving forward to implement the Superpave mix design method and related HMA Specifications (HMA-SP), with a target date of 2014 for full implementation. In 2012 at least six pilot projects will be completed using a draft specification, with more projects to follow in 2013. The provisional specification is being developed as a joint effort of Caltrans with the asphalt industry. Caltrans held a Superpave meeting on March 6, 2012, in its headquarters Translab to discuss the proposed specifications. A wide group of people attended this meeting including representatives from industry, CalAPA, UCPRC, and CP^2 Center.

Although Caltrans has been using the Superpave specification for asphalt binders (aka, the PG grading system) for a number of years, they are one of only a few states that have not also implemented the full Superpave mix design method and aggregate specifications. The move to Superpave will put Caltrans on par with the rest of the nation using the standardized system for specifying HMA materials.

The new mix design method will fully replace the California (Hveem) mix design method, which has been used since the 1950s. Part of the impetus for Caltrans' move to Superpave is the lack of service and replacement parts for some of the older Hveem equipment.

The Superpave technology will require testing labs to acquire several newer pieces of lab equipment, including the Superpave Gyratory Compactor and the Hamburg Wheel Track Tester. Currently only a few labs statewide have this equipment. Caltrans demonstrated their commitment to Superpave by ordering the new equipment for their numerous labs statewide.

The Caltrans lead person on this effort is Joe Peterson, Chief of the Office of Roadway Materials Testing at Translab in Sacramento. In Figure 1, he is showing a group of people the Caltrans Hamburg Wheel Track Tester.

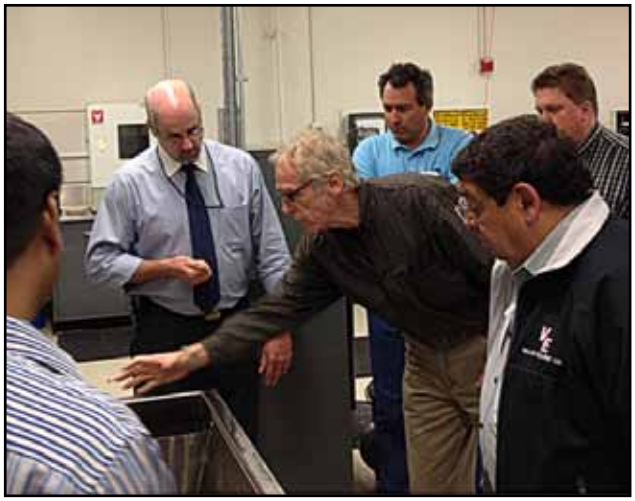

Figure 1, Caltrans Joe Peterson shows off the Caltrans Hamburg Wheel Track Tester

Los Angeles County pavement preservation strategies

By Erik Updyke, P.E, and Imelda Diaz, P.E, Los Angeles County

The Los Angeles County Department of Public Works (County) is moving into the second generation of pavement preservation projects with an emphasis on 1) chip seals using various binders and RAP chips, 2) RAP as aggregate in slurry seal and microsurfacing, and 3) an expanded fog seal program.

The County's pavement preservation program was inspired by the statewide Pavement Preservation Conferences held from 2006 through 2011, the California Chip Seal Association conferences during the same period, and the formation of the California Pavement Preservation Center in Chico, California. The knowledge gained from attendance at these conferences was transferred into the project and strategy selection for the first generation of pavement preservation projects. The scope of these projects included chip, slurry, scrub, and cape seals; microsurfacing; bonded wearing course; and resurfacing using rubberized asphalt concrete. Proposition 1B funded many of these projects. As with any new program, it was not without challenges and lessons to be learned, among them the importance of appropriate weather conditions for seal coat applications and how workmanship and appearance affects public acceptance.

The County has an extensive network of rural, primarily two-lane roads in the North County areas. Many of these roads are highly suitable for *chip sealing*. Both polymer modified emulsions (PME) and performance graded (PG) tire rubber modified paving asphalt (hot) have been used as binders in the past and will continue to be in the future. The aggregate of the future will be processed RAP. RAP was first used as cover aggregate on a scrub seal demonstration project placed in February 2008. To date, it is performing very well. The County now has a contract with CalRecycle to place a chip seal using hot PG tire rubber modified paving asphalt and RAP screenings. Hot-applied chip seals usually require pre-coated, heated screenings, which in some areas are difficult to procure. The RAP screenings, which are pre-coated with old residual asphalt, will be placed unheated (at ambient temperature) in the Lake Los Angeles area in early summer 2012.

The County has also had two projects in which RAP slurry, slurry seal using polymer modified asphalt emulsion and RAP aggregate, has been placed as part of a cape seal. Both installations have been very successful. The RAP aggregate gradation, which is between a Type I and Type II, and the requirement of rolling with a pneumatic tired roller, results in a smoother texture than has been observed on other County projects. The County will be specifying RAP slurry in the future, as well as observing the performance of RAP aggregate when used in microsurfacing.

The County's road network is extensively surfaced with rubberized asphalt concrete, primarily GAP-graded rubberized hot mix asphalt. Many of these roads are still performing well after 14 to 16 years with little or no maintenance or surface treatment. Last summer, the County initiated a fog seal program on various streets in the east County area which had either rubberized asphalt concrete or bonded wearing course on the surface. A PASS-QB polymer modified engineered emulsion and a fine black aggregate were placed in one operation by Western Emulsions using a distributor truck that both sprayed the emulsion and applied the fine aggregate. The fog seal program was very successful and well received by maintenance staff.

Completed fog seal on Cameron Avenue at Whitebirch Drive in Los Angeles County, California

Geosynthetic reinforced chip seals

By Ray Myers, Asphalt Interlayer Association

Geosynthetic reinforced chip seals (GRCS) involve placing chip seals [single or double] over polypropylene paving fabric [e.g., Petromat] or paving mats (fiberglass polyester blends) with various asphalt binders. GCRS projects have been performing successfully for more than 3 decades, even when placed over roads with extensive cracking (Figure 1).

This pavement preservation system has proven successful in fighting reflective cracking and keeping moisture out of the aggregate base layer.

A GCRS involves the following steps:

- Spray-applied hot PG binder (e.g., PG 70-22)
- Interlayer laydown (fabric or mat)
- Sanding (optional)
- Rolling (pneumatic tired)
- Sweeping of sand (if used)
- First chip seal application
- Second chip seal application (optional)

The success of the system is due to a very high percentage of asphalt involved. Combining the asphalt binder for the interlayer with the two applications of binder for the chip seals results in a total asphalt content in the system of over 15%. Therefore, the system remains flexible and crack resistant for a very long time.

Some practices for placing interlayers under chip seals vary slightly from their placement under an HMA overlay:

- Longitudinal joints are positioned on lane lines.
- The interlayer joints and seams are butted, not overlapped.
- Pneumatic rolling of the interlayer is mandatory.

Preparation of the surface is just as critical with a GRCS as it is with any maintenance product. The surface must be clean of moisture and debris. Any localized base failures causing vertical displacement of the surface should be patched. Cracks greater than ¼" must be filled with any product, even sand. The important point is to fill the crack void. The GRCS will match the existing profile; therefore, judicious use of leveling with HMA can result in a more acceptable ride quality and project acceptance.

GRCS can involve chip seals done with conventional emulsion (e.g., PMCRS-2), hot polymer-modified asphalt (PMA), or hot rubber-modified binders (e.g., PG76-22TR). The geosynthetic reinforcing interlayer can improve the life of the various chip seals and assure a waterproofing membrane.

A double chip GRCS is actually composed of three systems; an interlayer and two chip seals. Each system must be installed correctly to result in a quality

Figure 1. Original pavement condition (Sacramento County, California) prior to interlayer and chips seal application

GRCS. Insufficient or non-uniform binder application, or delayed placement of the interlayer into the binder will result in an unsaturated interlayer. This will rob later binder from the initial chip seal. Fabric wrinkles will dislodge covering chips. Overlapping the interlayer will either produce a dry top layer or a second binder application will make the system over rich. All of these issues are easily avoided by a competent installer.

Pneumatic tired rollers are used to assure total interlayer embedment into the PG asphalt binder. The interlayer can be sanded right after placement to allow increased rolling (Figure 2, next page). The sand is swept upon completion of rolling. Uniform sanding is very difficult to accomplish with a conventional chipper, especially if the sand is wet. But sanding units can place it more uniformly with ease, and should be required if sanding is required.

Once the interlayer is properly installed, all aspects of placing the chip seals are identical to any chip seal project. Please refer to the California Chip Seal Association www.chipseal.org/ for quality specifications. The interlayer and both layers of chip can be placed in the same day. The geosynthetic is always placed mechanically and can be done very rapidly, with precision. In 2010, 27 lane-miles of Hwy 127 were done for Caltrans. The fabric was placed in two days and the chip seal was placed in three.

Recent agency projects include the City of Williams, Sacramento County and four projects by Caltrans. These and many private projects are available for inspection and reference. The city and county projects were completed for about one-third the cost of "mill & fill", and required no ADA modifications.

Tim Cress with the Sacramento County DOT says, "For the last few years SACDOT has wanted to utilize alternative pavement treatments, especially in residential neighborhoods. Unfortunately, it took a bad economy to help jump start this desire. The

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Figure 2. Rolling of interlayer with pneumatic rollers after optional sand application (Sacramento County, California)

double chip seal on fabric treatment, along with other treatments, allows us the ability to perform preservative maintenance on more existing lane miles than we could using standard conventional overlay methods while still providing a high level of service life to residential pavements."

Skip Brown of Asphalt Consulting Services has overseen these projects for almost 30 years. He says, "I've not found another maintenance strategy that equals GRCS for stopping crack reflection and extending pavement life."

Quality specifications, competent contractors and crews and good inspection are very important and should result in money well spent. The Asphalt Interlayer Association (AIA) can assist you with every aspect of this pavement maintenance strategy. To determine if one of these processes is right for your pavement needs, please contact the AIA Executive Director, Ray Myers at 800-650-2342, or visit their website, www.aia-us.org.

Tehama County to preserve 100 miles of roadway

By Tim Wood, Tehama County DPW

Tehama County is a rural County at the northern end of California's Central Valley. The County Public Works Department maintains over 1100 miles of road, of which 1000 miles are either asphalt (HMA) or chip seal. When California voters approved Proposition 1B, a certain portion of those bond funds was earmarked for local roads and streets. In order to maximize the effectiveness of available funds, Tehama County has decided to utilize the majority of its $5.7 million allocation for pavement preservation. To date, over 40 miles of road have been preserved. Another 60 miles have been scheduled over the next two years to be preserved.

The County prioritized these projects based on road classification and condition rating using the Cartegraph software suite for road, bridge, sign and striping asset management. Condition rating reports were generated for all collectors and arterials in the County. Those roads with lower condition rating and higher traffic volumes were prioritized first. A list of prioritized streets was prepared and approved by the Tehama County Board of Supervisors.

The primary method for pavement preservation was single chip and double chip seals. Both methods utilized a polymer modified rejuvenator emulsion (PMRE) for the "engineered" asphalt emulsion binder. Many of the prioritized streets had not had any surface treatment in well over 10 years. The PMRE was chosen to provide good penetration into the existing surface and to replenish the lost oils in the old asphalt surface. The polymer and asphalt emulsion blend creates a tough binder that can hold stone chips very well. Via competitive bid, VSS Emultech provided their 'Styraflex' brand of rejuvenating emulsion. County maintenance workers from each road district, bridge and paint crews were utilized for the chip sealing operations, including chip application, traffic control, sweeping and striping.

The double chip seals received a first layer of Styraflex generally applied as a scrub seal at 0.43 gallons per square yard (gal/sy). The first chip layer of the double chip seal was 3/8" or ½" chips depending on the availability of the local aggregate company. The second layer of the double chip seal received a more conventional Polymer Modified Cationic Rapid Set emulsion (PMCRS) specifically designed for chip seals. The PMCRS was generally applied at a rate of 0.35 gal/sy and covered with ¼" chips.

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Application of PMRE scrub seal as binder for chips

The single chip seal used the PMRE applied at a rate of 0.35 gal/sy with a 5/16" chip. Both methods had a finish fog seal of VSS Emultech's Cationic Quick Set (CQS) emulsion applied at a rate of 0.11 gal/yd. This fog seal provided a good seal for both methods. It also had the benefit of providing a black surface for better striping visibility.

Performance of both Lals has been great in the short term. A condition rating on one of the roads showed an increase of the PCI from less than 50 to more than 90.

For additional information contact Tim Wood, P.E., P.L.S, Chief Deputy Director of Public Works, Tehama County, at timwood@tcpw.ca.gov.

Rolling the chip seal

FiberMat® performs for San Bernardino County

By Jonathan Lane, Sully-Miller Contracting

FiberMat was developed in the United Kingdom more than 20 years ago by Colas UK. It is a specially formulated, polymer modified, fiber impregnated membrane binder for use with chip seal applications or as an interlayer with various overlays (e.g. HMA, slurry seals, microsurfacing).

Figure 1. Fiberglass strands for FiberMat

Figure 2. FiberMat Layer

FiberMat provides strength and flexibility due to the utilization of chopped fiberglass strands Figure 1) that form a high tensile strength matrix. The FiberMat system is installed by a special machine that uniformly applies the fiberglass strands in a continuous application.

The strands are sandwiched between two layers of sprayed polymer-modified emulsion prior to the application of an aggregate cover. Much like a conventional chip seal, the final product is then rolled to seat the aggregate into the surface. The combination of highly modified asphalt residue and a fiberglass reinforcement matrix creates a crack resistant membrane (Figure 2.).

Sully-Miller Contracting introduced FiberMat to Southern California in 2010 by providing demonstrations for Caltrans' District 9 on Highway 6, for Nevada DOT in Ash Springs, Nevada, and for San Bernardino County off Stoddard Wells Road.

San Bernardino County, California, performed a comparison trial of FiberMat near Stoddard Wells Road, north of Victorville. "Test Strips" of FiberMat and a conventional chip seal "control" section were laid side-by-side. Fifteen months later, representatives from Sully-Miller Contracting and the County of San Bernardino reviewed the test sections, observing which cracks were sealed or not sealed, active or inactive. Officials of San Bernardino County determined that FiberMat was clearly outperforming the conventional chip seal - likely due to its strong fiber-reinforced waterproof membrane that's designed to absorb pavement stress and resist cracking. The fifteen month test in San Bernardino also demonstrated the FiberMat section had improved chip retention compared to the conventional chip seal, which showed excessive chip loss.

Medhat Matta, Pavement Management Engineer for the Department of Public Works, County of San Bernardino, approved FiberMat for use in the County of San Bernardino in November of 2011. Matta says,

> *"We used FiberMat in August 2010 on Stoddard Wells Road in the high desert area. We had decided to use conventional chip seal on one lane and FiberMat on the other so we could compare FiberMat against conventional chip seal. After 15 months on November, 2011, we had a field review and discovered that the reflective cracks on the FiberMat lane are still sealed, and the conventional chip seal lane has reflective cracks that have penetrated completely through. We feel that FiberMat is comparable in price or can be cheaper than conventional chip seal when you consider the extra years of service life you will add to your road when you use FiberMat. We consider FiberMat to be a valuable tool in our tool box and plan to use it much more in the near future for sealing our roads and also using it as a SAMI."*

For more information about FiberMat, please contact Jonathan Layne at jlayne@sully-miller.com or at (626)523-3366.

Public works officials warm up to cold-in-place asphalt recycling

Adapted from an MTC article by Brenda Kahn

When it comes to battling global warming, any technique with "cold" and "recycling" in its name is bound to be beneficial. So when MTC teamed up with the City of Napa, California, to stage a demonstration of cold in-place recycling of asphalt pavement in mid-October 2011, Bay Area public works officials were all eyes. The process involves just what its name implies: grinding up the old asphalt pavement, mixing in some new asphalt binder, and repaving it on the spot, at ambient temperatures.

The full-lane 12.5 foot asphalt milling machine

The closed-circuit asphalt recycling plant

Photos: Noah Berger

A series of three units on wheels — which are linked together to form a 142-foot asphalt recycling "train" — do the job of removing the asphalt to the specified depth by grinding it up, mixing it with a cold asphalt emulsion in a portable asphalt recycling plant, then repaving the roadway with the cold mix in a single pass.

"It takes the agency's old, distressed asphalt and recycles it into new asphalt base that's ready for a surface treatment," said James Emerson, a representative of Pavement Recycling Systems, Inc. of Mira Loma, California, which performed the Napa demonstration.

Under the conventional hot-mix asphalt system, jurisdictions need to remove the old asphalt and haul it away, pay to dump it (and in the process use up precious land fill), then pay for the new asphalt to be processed, trucked back and installed, according to Emerson. "For one mile of roadway at 12.5 feet wide and at a depth of three inches, you would require 83 truck loads, exporting and importing the material. For cold in-place recycling you would use two truck loads to bring in the engineered liquid emulsion binder for the recycling process, thereby saving 81 truck trips for the same one-mile stretch," Emerson said.

In addition to eliminating back and forth truck traffic, the process reduces energy inputs into the manufacturing process and eliminates the need for mining and production of virgin materials.

The technique not only is better for the environment, but also is faster and easier on city coffers, costing 40 to 50% less than traditional asphalt repaving methods and stretching impacted city budgets further.

Public works officials from around the region descended on the city of Napa on October 13 to witness the demonstration which was funded with $2 million in federal money provided through MTC's Innovative Climate Grants Program. Also benefiting from the grant is Sonoma County, California, which staged a demo in a more rural setting earlier in the month. A portion of the grant will go toward educating local public works departments about the method.

The double steel drum compactor

Hot-in-place recycling taking root in the Golden State

By Barry White, Technical Marketing Consultant

Historically, Hot-in-Place Recycling (HIR) has not played a role in the various pavement preservation programs throughout the Golden State. But for the past year, California agencies have been hearing about how they can "100% recycle" their existing pavements, often without having to add an overlay afterwards.

Per the FHWA Pavement Recycling Guidelines, "The primary purpose of HIR is to correct surface distresses not caused by structural inadequacy, such as raveling, cracks, ruts and holes, and shoves and bumps. The advantages of HIR are that elevations and overhead clearances are preserved, it is comparatively economical, and needs less traffic control than the other rehabilitation techniques."

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There are two types of HIR currently being promoted throughout California: 1) the "reheat" method, a one-step HIR process not involving an overlay, and 2) a two-step, HIR "surface scarification" method, usually followed by a surface treatment or an overlay. Both processes involve reheating the old pavement with special traveling heaters. (Figure 1)

One contractor has recently seen the opportunity to expand the HIR market into California. Gallagher Asphalt Corporation is a third-generation Chicago-based paving contractor/producer and also the country's third largest HIR contractor. Over the past year, Gallagher has entered the California market with presentations to key city and county officials, educating them on the features and benefits of HIR.

Figure 1. Pre-heating unit for HIR

HIR has successfully been performed throughout the country, including the cities of Chicago, Pittsburgh and Cleveland, as well as many smaller municipalities. In fact, after a pilot project last fall, the City of Chicago decided to incorporate both HIR processes into their resurfacing program for 2012. As David Montanye of the Cobb County (Georgia) DOT says, "The hot in-place pavement recycling process is a proven, cost-effective method of rehabilitating existing pavements without the need of removing and replacing with new plant mix asphalt."

The FHWA actively supports and encourages all in-place asphalt recycling efforts around the country through regional seminars, classes and work with other pavement research organizations. In fact, FHWA is planning to hold its annual Recycling Training & Demo Conference in Southern California over two days sometime in September. This would be a great opportunity for a local agency to showcase an HIR project in their city or county.

For further information about hot-in-place recycling, visit www.hotinplacerecycling.com or www.fhwa.dot.gov/pavement/recycling/98042/ or contact the author, Barry White at 530-305-9036 or bwhite.hipr@gmail.com.

Figure 2. Reheater unit for 1-step HIR

PCC PAVEMENT NEWS

Quiet PCC pavement technology

By Craig Hennings, Southwest Concrete Pavement Assn.

The Next Generation Concrete Surface (NGCS) is the first new concrete texture introduced in the past 20 years. It was conceived as a "manufactured" texture whose properties are consistent and predictable, and it represents the quietest non-porous concrete texture developed to date (Figure 1). At the time of construction the NGCS is typically a 99 dBA noise level, and has a typical range up to 101 dBA over time. Although the NGCS has only been in service 4 years, it is under evaluation at 17 locations in 10 states with more to come in California.

In 2005, with financial support from the cement industry, the American Concrete Pavement Assn. (ACPA) created a three-year effort to research tire-pavement interaction. The ACPA enlisted the aid of the International Grooving and Grinding Association (IGGA) and through that partnership the industry was able to study factors affecting diamond grinding and ultimately to develop a new diamond ground texture, which is now called the "Next Generation Concrete Surface." The vision for the NGCS was to address the many miles of in-place concrete pavements with loud transverse-tined textures.

Figure 1. Ground level view of NGCS surface

The NGCS texture was developed through research using Purdue's Tire Pavement Test Apparatus (TPTA) which allows testing of multiple surfaces under controlled laboratory conditions. Once the NGCS surface had been verified on the Purdue TPTA, it became necessary to verify its performance on a real road, constructed with actual diamond grinding equipment. Therefore, an agency partner was necessary.

The Minnesota Department of Transportation (MnDOT) joined the effort and provided a location on their MnROAD low volume road test track. In the summer of 2007, the IGGA funded Diamond

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Surfaces, Inc. to construct the Purdue NGCS surfaces at the MnROAD's facility. The single pass and double pass NGCS surfaces were successfully constructed and verified the ability of Purdue's TPTA to predict the noise levels of field installations. The Purdue research had indicated the NGCS should be approximately three dBA lower than the conventional diamond ground textures evaluated, and the MnROAD testing verified this finding.

With the success of the MnROAD experiment, it became necessary to construct a full-lane width test section of NGCS on an in-service highway. That opportunity occurred in the fall of 2007 via a test section on I-355 near Tinley Park, Illinois. The second NGCS was constructed on I-94 on the MnROAD mainline section in partnership with MnDOT. This was the first full-width roadway construction, and the first NGCS placement on an existing roadway.

Today there has been 17 NGCS surfaces constructed in 10 states, with one located in Phoenix, Arizona the quiet pavement capital. In May 2010, the Arizona DOT constructed a two lane wide NGCS test section to evaluate the noise levels against their asphalt rubber friction course which was used to cover up the transverse tined PCCP in the Phoenix area.

In the summer of 2010, the largest ever NGCS project was constructed in Duluth, Minnesota consisting of 104,000 sq. yd. of NGCS grinding. MnDOT constructed the project, which went right through downtown Duluth, as a noise mitigation effort.

Roadway smoothness has always been important to consumers, and the NGCS surface delivers on that front also. Since the diamond grinding process was first developed in California in the 1960s to restore ride to old concrete pavements, its hallmark has been smoothness. The sections in Arizona and Virginia achieved International Roughness Index (IRI) levels of 24 in/mi and 21 in/mi, respectively.

In 2011, California constructed its first two NGCS sections with five more to be constructed in 2012. When those sections are completed, California will have constructed the most NGCS sections in the nation.

For more information please contact Craig Hennings, Southwest Concrete Pavement Association, (209)499-9052 or chennings@pavement.com.

Caltrans updating slab replacement guidance

By Doran Glauz and Bill Farnbach, Caltrans Headquarter

Slab replacement has been a valuable corrective maintenance strategy for Caltrans' portland cement concrete (PCC) pavements for a long time. Corrective maintenance is typically funded by Capital Improvement Program (CAPM) and Highway Maintenance (HM) programs. Slab replacement is not a rehabilitation strategy so project design life is in the 5–10 year range. The project design life is a function of the overall road performance and not the replaced slabs' performance. Remaining old slabs, even if in good condition at project time, will be deteriorating over the ensuing years. The accelerated deterioration of joints between replaced and existing slabs, as well as the breaking of adjacent slabs, have been observed.

The first slab replacement guide was published by Caltrans in 2004 and since then some policies and practices have been changed. The changes are reflected in the new guidance, Chapter 5 of the *Rigid Pavement Preservation and Rehabilitation Guide* (the concrete pavement version of the MTAG). The Guide is not yet published, but will be available by the end of July 2012. Figures 1 to 3 on the next page show some steps of a typical slab replacement.

Among the enhancements in the new Guide are improved guidance on the types of damaged slabs that should be replaced, and the design life criteria for that replacement. It also contains improved discussion on installation of dowel bars and areas of multiple panel replacements. There is also direct reference to where the various relevant specifications are located (Standard Specification sections and SSP numbers) within the 2010 specifications of Caltrans.

New SSP's are being written to improve quality control and construction administration. The SSP's will be published in the fourth calendar quarter of 2012. Until then there are nonstandard special provisions (NSSP) available from the Pavement Program, Office of Concrete Pavement and Pavement Foundation.

Design life criteria

There are three design periods to consider for slab replacement: 1-year (immediate need), 5-year (short term) and 10-year (long term). The different design periods dictate the types of damaged slabs to be replaced.

A one-year design period is an emergency repair, and only panels that present an immediate hazard to the traveling public should be replaced. Such a slab would present an uneven surface or a potential for loose material. It would be broken into three or more pieces and would likely have a segment that is lower than adjacent pavement by one

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Figure 1. Preparing for pouring of replacement slab. Plastic sheet is a bond breaker.

Figure 2. Constructing the replacement slab with rapid strength concrete (RSC).

Figure 3. Completed slab replacement with final texture and curing compound.

or more inches. It probably manifested as rapid deterioration after a storm event.

A five-year design period will encompass the above damaged panels and other highly damaged panels that do not present an immediate concern to travelers. These will include all panels with third stage cracking with either wide (>½-inch) working cracks and/or settlement of some of the pieces. Third stage cracking is defined as a panel that has either two or more intersecting cracks or two or more corner cracks, both of which effectively break the panel into three or more pieces, as well as panels with multiple transverse cracks that result is a segment that is less than 6.5 feet long. These panels have a good chance of developing into an emergency within five years time.

A 10-year design period will encompass all the above damaged panels and other moderately damaged panels. A 10-year project will also replace panels that have cracks that are more than ¼-inch wide, and remaining panels exhibiting third stage cracking.

If any selected design life would result in a total slab replacement of 5 to 20 percent in any one lane, life cycle cost analysis comparing slab replacement to lane replacement should be done. If total number of slabs in any one lane is 20 percent or more, lane replacement should be done in lieu of slab replacement. The slab replacement count includes the present distressed slabs plus half of the slabs that have been previously replaced.

Related work

It is generally a good practice to perform other minor work within the limits of a slab replacement project. These should include spall repair, grinding for ride quality if remaining lanes have International Roughness Index (IRI) of 170 inches/mile or more, and shoulder repair or maintenance. Slab replacements should be ground as part of the project.

Dowel bars and slab replacement

When a slab is replaced, any aggregate interlock that existed is destroyed. In order to restore the lost load transfer capacity, dowel bars should be installed between new and existing slabs. Without the dowels, the joints will develop faulting and the slabs will crack. The best practice is to drill and bond dowels into the existing slabs. The dowels should have expansion caps on the end that's imbedded into the new concrete.

Dowels are *not* installed in the joints between two contiguous monolithically poured panels. Though it may sound like a good idea, it is an unnecessary expense, since the aggregate interlock lasts beyond 10, and often beyond 20 years, whereas the slabs (or adjacent slabs) will typically crack before then. The exceptions are if the existing pavement is fully doweled or if the project includes dowel bar retrofit in the lane as part of the project. When the slab replacement is within the limits of a dowel bar retrofit project, the dowels should be cast into the new slabs rather than retrofit, and the dowel bar pattern should mach the retrofit pattern.

Slab replacement for rehabilitation

As mentioned in the first paragraph, slab replacement is a maintenance strategy and not a rehabilitation strategy. However it is possible for slab replacement to be incidental work associated with a rehabilitation project, much like spall repair is incidental work associated with a slab replacement project. An example is a 4 lane (one direction) freeway roadbed that is being rehabilitated with a lane replacement in lanes 3 and 4. It would be appropriate to also do any necessary slab replacements in lanes 1 and 2. Another example is a capacity improvement and rehabilitation project where lane 3 is being replaced and lane 4 is being added. Again it would be appropriate to replace slabs in lane 1 and 2 as needed.

In the case of rehabilitation using hot mix asphalt (HMA) overlay, guidelines for preliminary slab repair can be found in Section 620 of the Caltrans Highway Design Manual.

Conclusion

Slab replacement is a continuing useful strategy done through contracting out or by Caltrans maintenance forces. The policies and technical details around slab replacement continue to evolve. The Division of Maintenance, Pavement Program continues to maintain standards regarding slab replacement. For more information visit the Program's web site at www.dot.ca.gov/hq/maint/Pavement/Offices/Pavement_Engineering/index.html.

GENERAL NEWS

FHWA news and update

by Steve Healow, FHWA Sacramento

Web-based Transportation Curriculum Coordination Council (TCCC) short courses are accessible through the National Highway Institute (NHI) Web Site. If you find your training budget or schedule is tight this year, consider the TCCC series on Pavement Construction, Paving Materials and Pavement Preservation Treatments. There are over 40 web-based short courses accessible through the NHI web site, www.nhi.fhwa.gov. At the NHI site, search for TCCC to see the complete list. Follow directions to set up an account to enroll. All TCCC web-based courses are free and require one to eight hours to complete.

A 50-page publication, Guidelines for the Preservation of High-Traffic-Volume Roadways, is a handy dashboard or desktop reference for anyone involved in the selection or construction of pavement preservation treatments. The text provides guidance on selecting and constructing appropriate preservation strategies, considering traffic, pavement condition, climate, anticipated performance and costs. This SHRP2 publication is available through TRB at $43/copy or downloadable at http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2-S2-R26-RR-2.pdf.

Historically over half of all fatal crashes involve vehicles running off the road and rural crashes are twice as lethal as urban crashes. To make rural roads more user-friendly FHWA California Division is partnering with Caltrans Office of Local Assistance and Calaveras County Department of Public Works on the Mountain Ranch Road Guardrail and Safety Edge Project (Figures 1 and 2).

Figure 1. Safety Edge on HMA pavement

Figure 2. Safety Edge on PCC pavement

The County is the recipient of a $300k grant under the 'Highways for Life' program. Their project will include over four miles of Safety Edge. Plumas County Public Works was the first agency to incorporate the Safety Edge on an overlay project near Quincy in 2010. Caltrans constructed four pilot projects including the Safety Edge in 2011 and has plans for twelve more projects in 2012. See also http://safety.fhwa.dot.gov/roadway_dept/pavement/safedge/brochure/

FP^2 update

The Foundation for Pavement Preservation (FP^2) Inc. ended 2011 with over 70 visits to Capitol Hill. There is plenty of pavement preservation language in the bill introduced in November by the Senate Environment and Public Works committee, MAP-21, and the House Transportation and Infrastructure committee bill, The American Energy & Infrastructure Jobs Act, introduced earlier this month. Many details still need to be worked out.

California's asphalt pavement associations merge

Russell Snyder, left, and Jim St. Martin.

The leadership of the Southern California-based Asphalt Pavement Association of California (APACA) and the Northern California-based California Asphalt Pavement Association (CalAPA) voted to merge into one statewide industry association effective January 1, 2012. The prime motivation for the merger is to more effectively and efficiently represent the entire asphalt pavement industry in California.

The Executive Director for the new California Asphalt Pavement Association (CalAPA) will be Russell Snyder, headquartered in West Sacramento. Technical Director is Jim St. Martin, working out of the Laguna Hills office.

TRB meeting held in Washington DC

The 91st Transportation Research Board (TRB) annual meeting was held in Washington D.C. from January 22 – 26, 2012, attracting more than 10,000 transportation professionals from around the world. The meeting covered all areas of transportation with 4000 presentations and nearly 650 sessions or workshops. The theme of the 2012 meeting was *Transportation: Putting Innovation and People to Work.*

It was an excellent opportunity to learn about and promote pavement preservation concepts. Dr. Ding Cheng, Center Director, attended the meeting and presented two papers for the CP^2 Center: 1) "Life Cycle Cost (LCC) Comparison of Rubberized and Conventional HMA in California" and 2) "Performance-Based Approach to Integrate Pavement Preservation into PMS" (co-authored with Sui Tan of MTC). He also attended meetings of the AHD18 - Pavement Preservation Committee, AHD20 - Pavement Maintenance Committee, and AFD10 - Pavement Management System Committees. Roger E. Smith of Texas A&M University was elected as the new chair of the AHD18 Pavement Preservation Committee.

Billy Conner, Univ. of Alaska (left), Roger E. Smith, Texas A&M, and Ding Cheng (right) at TRB meeting

The 91st TRB Compendium of Papers is available online at: http://AMOnline.TRB.org.

CP² CENTER NEWS

Development of CP² Center laboratory

By Ding Cheng, CP² Center

Some new things are happening at the California Pavement Preservation Center at CSU, Chico.

With the funding support and donations from CalRecycle, Caltrans, U.S. Forest Service, and industry support, the Center is developing an asphalt pavement laboratory to serve both research and teaching needs at California State University, Chico. The following are selected pieces of new equipment that are currently being used on various projects.

Asphalt binder or emulsion testing equipment

- **BBR** - The Bending Beam Rheometer (BBR) test provides a measure of low temperature stiffness and relaxation properties of asphalt binders. These parameters give an indication of an asphalt binder's ability to resist low temperature cracking. The CP² Center has used the BBR to compare the performance of various fog/rejuvenating products.
- **DSR** - The Dynamic Shear Rheometer (DSR) is used to characterize the viscous and elastic behavior of asphalt binders at various temperatures. This characterization is used in the Superpave PG asphalt binder specification. The Center's DSR model can perform the test on asphalt rubber binder, as well as other modified binders. Figure 1 shows Jeff Mental of Malvern, Inc. giving training to the Chico State students.
- **RTFO** – The Rolling Thin Film Oven (RTFO) device simulates short-term aging of asphalt binders that occurs during mixing and lay-down of hot-mix asphalt. This conditioning treatment is run on asphalt binders to prepare them for testing.
- **Brookfield Viscometer** - measures an asphalt binder's ability to be pumped at mixing temperatures. Temperature/viscosity data are developed to estimate mixing and compaction temperatures for use in binder PG grading or HMA design.
- **Others** – The CP² Center can also perform ductility tests, kinematic and absolute viscosity, penetration, elastic recovery, ring and ball softening point, flash point, etc., as well as some tests on asphalt emulsions.

Asphalt mixture testing equipment

- **APA** – The Asphalt Pavement Analyzer (APA) is a multifunctional Loaded Wheel Tester (LWT) used for evaluating permanent deformation (rutting), fatigue cracking and moisture susceptibility of both hot and cold asphalt mixes. The APA can be used to conduct the *Hamburg Wheel-Track Testing* on asphalt mixtures following AASHTO T324.

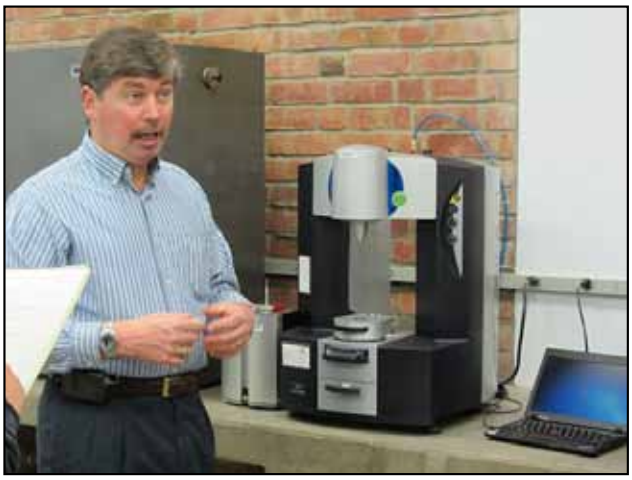

Figure 1. Jeff Mental giving training on using the new DSR of the CP² Center.

- **SGC -** The Superpave Gyratory Compactor (SGC) is used in the Superpave mixture design system to prepare asphalt concrete specimens for determining volumetric and mechanical properties. CP2 Center has used the SGC on a number of projects using rubberized hot mix asphalt with warm mix additives.
- **Others -** NCAT ignition oven for determining binder content, various volumetric tests (Rice specific gravity, bulk specific gravity, and a Corelok device from InstroTek.

The CP² Center is always looking to expand its capabilities and would be interested in donations and funding sources to continue to build more capability for research and education. If you have any information, please contact Ding Cheng of the CP² Center.

Pavement preservation treatment database needs your input

By Ding Cheng, CP² Center

Keeping track of field trials and performance of new pavement preservation methods has always been a challenge. Many field trials are never properly documented and the information not shared with other agencies. That problem is being tackled by the CP² Center.

To enhance Caltrans' management of pavement preservation innovations and promote effective pavement preservation techniques, a pavement preservation treatment database has been developed by the CP² Center. The database will help keep track of the performance of innovative pavement preservation projects – both at the Caltrans and local agency levels. With the similar purpose

Continued, next page

as FHWA's LTPP program, it has long-term value in helping Caltrans and local agencies obtain pavement preservation performance information, such as multiple year survey results, expected life and life-cycle cost from the stored project data. The website for the Database is: www.ecst.csuchico.edu/cp2c/software/pptdb.

There are three user levels in this database: general users, advanced users, and the database administrator. To promote knowledge sharing among agencies and industry, anyone can go to the website and create an account and log in as a general user to view the projects. An advanced user can view the project information as well as add new projects and edit their own existing projects.

This new database will be a valuable resource as more and more innovative products become available for pavement preservation. But it will only serve its intended purpose if users participate and enter their projects into the database. Do you have an innovative project to contribute? If so we hope you'll participate.

Home screen of the Pavement Preservation Treatment Database for a general user

COMING EVENTS

Mark your calendar

Planning continues for the 2012 **National Pavement Preservation Conference** in Nashville, August 27-30 in Nashville, Tennessee. The Technical Committee co-chaired by Roger Olsen, Ding Cheng, and Rod Birdsall are putting the final touches on the technical sessions. Speakers are being invited to present the latest and best information on pavement preservation topics including materials, equipment, best practices and related research.

Demonstrations are also planned at a site near the hotel to showcase several preservation techniques.

Mark it on your calendar and plan to attend. For more info go to: www.nationalpavement2012.org/

The **Metropolitan Transportation Commission (MTC)** will hold its Spring User Week March 26 – 29 at their Oakland, California, headquarters. User Week is a combination of classes and activities intended to act as a forum for users of their StreetSaver® pavement management system. All 109 municipalities in the Bay Area and many others are users of StreetSaver. In addition to StreetSaver software discussions, attendees learn about new technologies, discuss implementation issues, and receive updates on the status of the Regional Streets and Roads Program. For more info contact khughe@mtc.ca.gov.

The **California Asphalt Pavement Association (CalAPA)** holds Regional Technical Committee meetings throughout the state. These meetings are open to public agency people. Go to http://calapa.net for more information on upcoming meetings.

The Asphalt Institute will hold a one-day class on **"Construction of Quality Hot Mix Asphalt Pavement"** April 23 in Union City. The workshop has been designed for engineers, inspectors, technicians and contractor personnel responsible for quality control of paving materials, mix designs and the inspection and operations of asphalt plants, and paving operations. Participants should include personnel from federal, state, county and local agencies, airport authorities, paving contractors, consulting engineers and testing laboratories.

The cost of the class is $195 and comes with seven PDH credits and a copy of the Asphalt Institute's MS-22 construction manual. For more detailed information and registration visit: www.asphaltinstitute.org.

Caltrans established the California Pavement Preservation (CP^2 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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