



# CP<sup>2</sup> CENTER NEWS

Newsletter of the California Pavement Preservation Center

No 3

September 2007

## Interview with Caltrans' Randy Iwasaki

Caltrans understands pavement preservation and is considered a national leader in the area. Randy Iwasaki is the Chief Deputy Director for Caltrans and was very instrumental in developing the program. In an interview on June 15 he answered the following questions related to pavement preservation in the State of California.

**Q: When and how did pavement preservation begin in California?**

**A:** Pavement preservation efforts began in the mid 90's and really took off in 1997 following the Kansas City Forum for the future on pavement preservation. Larry Orcutt and I attended this meeting. We brought back the idea to start a pavement preservation program in the State of California.

In addition, the Department has established a maintenance directive that requires at least 50 percent of all pavement maintenance be preventive maintenance. The Department's pavement preservation budget has grown from \$100 million to over \$300 million, showing that upper management has bought into the concept of pavement preservation.

**Q: What is the department's vision in pavement preservation over the next 5 years?**

**A:** Caltrans improves mobility and provides comfortable, safe and long lasting roads. We have over 50,000 lane miles of freeways and highways with 40,000 lane miles in fair to good condition and the remainder in poor condition. We have to balance the need to reduce the number of distressed lane

miles while not allowing the degradation of the pavement in good condition.

This means we have to use the appropriate strategies, activities, and funding to reduce or prevent a backlog over the next five years. We have to put a high priority on keeping our roads good. Caltrans has a mandated 5-year plan to prevent increases in rehabilitation needs by adding

over \$60 million a year for five years. This will avoid a total of \$300 million in pavement rehabilitation in five years.

Also, we have to reach out to our partners both locally and nationally. We must move away from "worst first" to a proactive "preventive maintenance" program. This will require education of the public and decision makers. We need to collect data to show conclusively the benefits of pavement preservation. The Pavement Preservation Center and UC Davis are working on studies to help provide this information.

In summary, we must preserve our assets. Pavement preservation is applied asset management. We must pool our resources, talents and expertise in order to maximize the return on our investment.

**Q: What are the critical issues/ barriers facing Caltrans in terms of pavements?**

**A:** Pavement preservation competes against capacity issues and reconstruction. We have to overcome these challenges including the aging infrastructure, growth in freight, congestion, limited resources, budget cuts, customer expectations and ever-changing business practices.

We need to buy time to manage our largest challenge – infrastructure rehabilitation.

Caltrans and our local agencies need effective pavement management systems with a robust database. Caltrans is working on making this happen. Hopefully, a new system will be fully functional within two to three years.

We need to continue to grow the dedicated funding for pavement preservation by showing clear benefits and we must be innovative in our approaches to using new technologies and preserving our natural resources through recycling and other means.

Finally, we must educate the public, our staff and decision makers on the benefits of pavement preservation.

**Q: What is the role of pavement management in improving the pavement preservation program?**

**A:** Pavement preservation strategies are good investments, but they must be applied on the right road, at the right time, the right location and the right environment. We need to have a proactive approach to pavement preservation and be able to predict and forecast future needs and allocate money accordingly. We cannot do our best with



Shakir Shatnawi (left) and Gary Hicks (not pictured) interviewed Randy Iwasaki for this story.

Continued on next page



pavement preservation without a good pavement management system. We hope to have a new system up and running in a few years which will provide information on the lives of all treatments and the extended life (delaying of rehabilitation) associated with pavement preservation treatments.

**Q: What is the role of the Pavement Preservation Center and the Pavement Preservation Task Group (PPTG) in moving Caltrans forward with pavement preservation efforts?**

**A:** Formation of the Center and the PPTG will prove instrumental in helping us quantify the benefits of pavement preservation. It also shows Caltrans' commitment to pavement preservation and its willingness to collaborate with others on pavement preservation issues. Caltrans is very proud of these accomplishments and needs to thank Steve Takigawa and Shakir Shatnawi for making it happen. The Center and the PPTG work together in a variety of ways:

- The PPTG provides advice to the Center, Caltrans and local agencies.
- Industry is an integral part of the PPTG process. Their involvement with the Center is very important.
- Local agencies' participation is important because we have to address all pavements in California, not just Caltrans roads. Local agencies use Caltrans specifications.
- The Center is also working with the Western Pavement Preservation Partnership (WPPP) to provide services to other western states.
- Caltrans sees the Center as a credible third party that is non-biased.

We see the Center and the PPTG as catalysts for bringing innovations and enhancing our speci-


cations and guidance. The Center and the PPTG are also instrumental for a very successful annual pavement preservation conference. The next one is scheduled for April, 2008, in Southern California.

**Q: What is the importance of partnering?**

**A:** Partnering means working together from the start – from strategy selection to specification to construction. Workable state-of-the-art specifications are needed for all the preservation treatments used in the state. Partnering also means shared responsibility and accountability for quality and delivery.

Partnering is proactive and provides credibility in shared visions and goals and shared experiences. It means doing the right treatment at the right time at the right location. Through partnering, we have developed very good technical guidelines – the Maintenance Technical Advisory Guide (MTAG) has good guidance on all strategies. By partnering we can resolve any of the problems we face, except for budgeting issues.

Partnering ensures that those who work with Caltrans are involved in the decision making process. It means striving to meet partners' needs and providing alternatives to minimize impacts of decisions we make, and it also means working together to preserve, protect and enhance our roads and ensure all parties understand intent, roles and responsibilities.

The PPTG is our partnering platform for pavement preservation in the State of California. Caltrans is also a nationally recognized leader in the Strategic Highway Research Program (SHRP 2 – <http://www.trb.org/shrp2>). We are helping with the development of the research agenda and are placing our good people on panels. We are also involved in developing the FHWA roadmap for pavement preservation. 



Intersection of Santa Clara Co. Route G4, San Tomas Expressway, with Monroe Street



**Pavement management in an urban environment**

**Background**

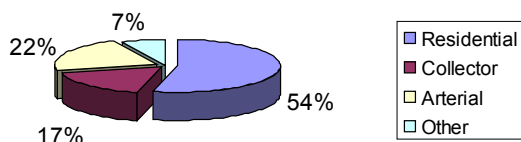
**T**he City of Santa Clara was incorporated as a "city" in 1852. One hundred and fifty five years later, Santa Clara has contributed to a much larger urban area

generally described as the South Bay. Demographically, Santa Clara is nearly 20 square miles in area, 240 centerline miles of streets and is home to over 110,000 residents. During the work day, Santa Clara population swells to over 180,000. Santa Clara is in the heart of the "golden triangle" and as such, enjoys a vibrant technology and industrial sector.

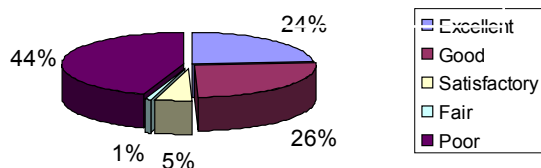
Santa Clara is 98% developed. New construction is typically of higher density. The street network, which is comprised of 1,357 management sections, meets the increasing demands placed upon it each day. This challenge has been met despite the economic pressures that have caused improvement budgets to be stagnant, or in some cases reduced. In this environment of growing demands and limited budgets, the pavement management system StreetSaver, as administered by the Metropolitan Transportation Commission and maintained by the City of Santa Clara, has been instrumental in balancing needs and costs. The current pavement condition index (PCI) of the city street network is 84. Major street network data are contained in the charts on the next page.

*Continued on next page*

**City of Santa Clara**  
**Functional classifications of street network**



**City of Santa Clara**  
**Condition status of street network**



**Benefits of Planning**

In implementing and maintaining a coordinated pavement management system, Santa Clara has been efficient in applying timely preventative maintenance treatments to the street network. This is made possible because of the broad perspective provided by the pavement management system. In implementing this system, decision makers are able to quickly

compare needs to anticipated cost and how these proposed improvements affect the overall street network PCI. As a budgeting tool, this is valuable in determining annual dollar needs. As a maintenance tool, timing and type of treatments become better coordinated with the overall needs of the street network.

As with any system, the outputs of the pavement management system are only as good as the inputs. Street condition surveys, conducted biannually on collector streets and every five years on residential streets are important – especially if your street network is required to carry more frequent and often times heavier loads. Also of importance is the precision of your street condition surveys. Subjective accuracy, although required, is subordinate to the quality of your surveys being relative to each other. In practice, this means having the same method and/or personnel perform your surveys.

In Santa Clara, relative precision is achieved through the use of a computerized digital imaging process that is able to analyze pavement failure both in terms of frequency and severity. For each survey cycle this process is repeated. The advantage is Santa Clara’s ability to objectively compare survey results between survey cycles. As a tool, this process allows decision makers additional confidence in assessing the condition of the street network.

Other ways to increase confidence in the system is to update the cost of maintenance treatments annually. Costs have been annually, if not monthly, escalating. Not accounting

for inflation will cause the decision maker to make decisions late in the process – typically after bids are let. The result is projects not being completed or as is typically the case, projects restructured disproportionately towards reconstruction or to preventative maintenance. In either event, the overall street network suffers due to the subsequent poor timing of treatment methods.

**Treatment Methods Employed**

Preventative treatment methods, from least to most costly, used in Santa Clara include fog sealing, type II & III slurry and rubber cape seal. In terms of area covered, Santa Clara is trending towards a larger fog seal program each year. All type II slurred streets are fog sealed within two years of slurry.

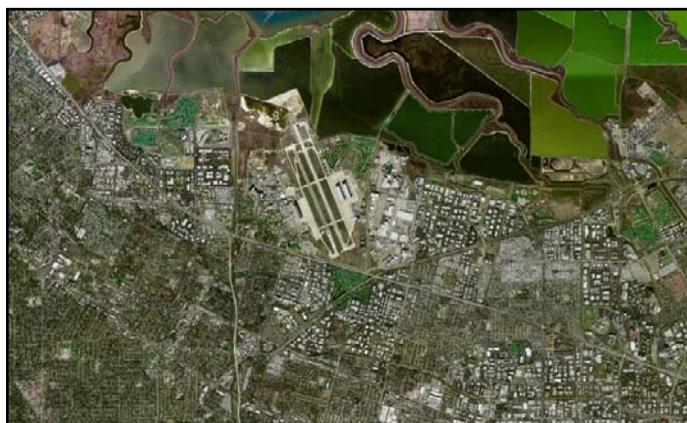
The benefit of the fog seal program has been two fold. One benefit has been the reduction of fines lost on new asphalts and slurries protected by the fog seal. The second benefit has been aesthetics. Fog seal streets are uniformly black. The end result has been streets maintained at the lowest possible costs while deferring more expensive treatment methods to future years.

Prior to any preventative maintenance treatment, areas of asphalt failure are removed. The Santa Clara goal is to remove and replace the failure a minimum of one year prior to the preventative maintenance treatment. This process also applies to crack-filling. The purpose of this is to establish confidence that the limits of the failures were adequately defined. For a manager of streets, there are few things more disappointing than a newly slurred street that shows signs of sub-grade failure within the first winter of treatment. This process is especially applicable when your street network is required to do more with less - as is the case when the frequency / intensity of the load placed on the street is greater than anticipated in the original design.

On streets that require additional structural section, Santa Clara utilizes one of two options. Conventional mill and overlay is the first and reconstruction with lime/cement treated sub-base is the second. Many streets, due to existing improvements and/or high crown are not candidates for mill and overlay. To overcome these constraints, while also minimizing conflicts with underground utilities, Santa Clara has successfully completed five years with five plus miles of streets reconstructed using full depth reclamation (FDR). When specifying a FDR project in an urban setting, it is important to educate the residents and take all reasonable efforts to minimize inconveniences.

For more information on the application of the pavement management system used in the City of Santa Clara, please contact Roger Lee (Street / Storm Drain Maintenance Superintendent) at [rlee@ci.santa-clara.ca.us](mailto:rlee@ci.santa-clara.ca.us) or (408) 615-3080.

**Satellite view of some Santa Clara streets**





# Western Pavement Preservation Partnership (WPPP)



## Background

The Western Pavement Preservation Partnership is pooling the efforts of participating agencies to provide a focused look at pavement preservation and will partner with other regional and national pavement preservation efforts. Pavement preservation issues include pavement policy, specifications, field investigations, applied research, and materials and training. Some of the issues to be considered include the following:

- Document the economic benefits of pavement preservation by identifying the extended life for various pavement preservation strategies.
- Develop correct timing for pavement preservation treatments.
- Integrate pavement preservation with pavement management systems.
- Improve pavement preservation performance and performance prediction.
- Promote the need for dedicated funding for pavement preservation.
- Understand performance variability of strategies and improve consistency of pavement preservation treatments.
- Communicate cost-effectiveness of various strategies.
- Implement innovation and encourage technology transfer.

## Objectives

The purpose of the Western Pavement Preservation Partnership (WPPP) is to provide a partnering forum for promoting effective pavement preservation strategies through the following objectives:

- Provide funds for an annual workshop for discussion and exchange of information and knowledge about each state's pavement preservation program.
- Provide a means to define, support and share technology of mutual interest in the area of pavement preservation.
- Provide funds for formal training presentations during the annual workshop.
- Provide funds to manage the WPPP's operations and to maintain a web site that would display meeting reports, state guidelines, and specifications.
- Provide funds for special studies, investigations, and training.

## Expected Benefits

There is an increasing demand for advice and consultation to develop and improve pavement preservation programs. The WPPP pooled fund will be able to provide pavement preservation advancements by offering:

- Shared pavement preservation expertise and exposure to national and international knowledge.
- Fasttrack technology transfer, training and deployment of pavement preservation innovations.
- Timely solutions to pavement preservation issues.
- Solutions to overcome agency challenges and business practices.
- Solid working relationships and partnerships with Industry, academia and other public agencies.
- Minimum duplication of efforts as a result of working on common objectives.
- Cost reduction as a result working on common issues.
- Identification of common research needs, funding mechanisms and priorities.

## Membership

Four states were the founders of the WPPP (CA, HI, NV and WA). Their first meeting was held in April 2007 to establish a charter and to layout plans for growing the partnership. Each member state or agency provides funding to support the partnership for a three year renewable period. The three year commitment of funds can be split over the three years or the full amount can be committed in the first year of the program.

## Contacts

For more information on the WPPP or information on how to join, please contact:

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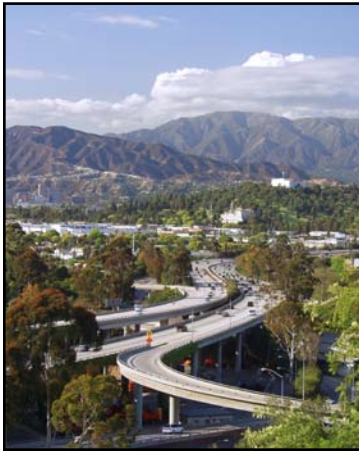
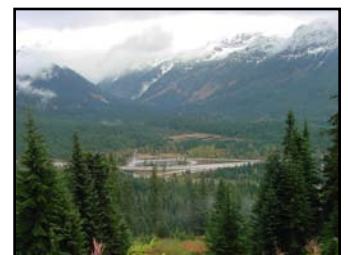
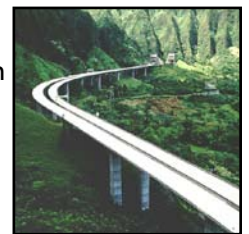
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Transportation departments of four states comprise the WPPP: California, Nevada, Hawaii, and Washington.



## Pavement preservation innovation initiative

Founded in July, 2006, the Center is actively involved with Caltrans and the Pavement Preservation Task Group (PPTG) on the implementation or evaluation of new and innovative products as one of its tasks. Other tasks include documenting the benefits of pavement preservation, training and staff development, improving pavement preservation performance, providing technical assistance, and promotion of pavement preservation throughout the state. Caltrans has provided \$5,000,000 per year to encourage the use of new technologies. Some of the products that are being studied include:

- **Microsurfacing:** New specifications for microsurfacing have been tested and evaluated in field sections. These products are being used more and more now that some of the construction issues have been resolved.
- **Fog and rejuvenating seals:** 3 test sections are being placed this summer to assist in the development of new performance based specifications. The testing includes skid testing and tests for stiffness of the mix to insure safety to the users and that the agents are imparting some positive effects to the existing mixes.
- **Interlayers:** Caltrans placed test sections in district 2 to evaluate the use of different interlayers in combination with chip seals or thin asphalt concrete overlays.
- **Chip seals:** Caltrans is evaluating asphalt rubber chip seals using test sections in District 11. The performance of the current designs in hot climates, with high traffic, has resulted in some bleeding. The design variations include changes in the aggregate gradation and the stiffness of the binder.

All of the current and proposed studies are summarized in the tables on the right. The findings from the current and proposed test programs will be used to assist Caltrans and the PPTG in the development of improved specifications for tools not normally used in the state. Caltrans, the PPTG and

the Center are trying to identify as many of the applicable tools as possible for use in pavement preservation. We are also currently updating the maintenance technical advisory guide (MTAG) to include current and new technologies.



### Innovative products currently under evaluation

Product/Process	Status
RAC-O-HB	Projects placed in statewide. They are currently under evaluation.
European quiet mix	One project placed in southern California. It is currently under evaluation.
Thin bonded wearing course – open graded, gap graded with polymer or asphalt rubber	Routinely used since the late 90's. Caltrans is now experimenting with variations in the gradations and materials.
Microsurfacing	Evaluated a new specification. Now Routinely used in California.
AR chip seals	Have been routinely used. Currently evaluating changes in specs in D11 test site to minimize wheel track bleeding.
Interlayers	Test section placed in D2 to evaluate the following interlayers; <ul style="list-style-type: none"> <li>• Modified binder asphalt</li> <li>• Poly/fiberglass fabric</li> <li>• AR chip seal</li> <li>• PME chip seal</li> </ul>
Fog/rejuvenating seals	Three test projects will be placed statewide to evaluate the various products used in California for surface seals.

Evaluations of cold-in-place (CIR), right, and hot-in-place (HIR) recycling products are scheduled for fiscal year 2008.



### Innovative products to be evaluated in FY 7108

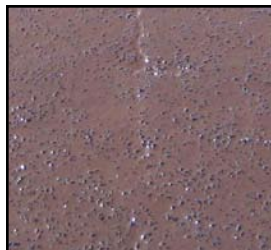
Products	Status
Surface recycling	Project to be placed in D2 and D8
CIR recycling	Projects to be placed in D3 and D11
PMA chip seals	Project to be placed in D11
Warm mixes	Project to be placed in D5 with another perhaps in D1



## Fog and rejuvenating seals

Caltrans routinely uses fog seals and rejuvenating seals routinely as a part of their maintenance program. However, a moratorium was placed on the use of these products after a fatal accident on Interstate 5 near Dunsmuir. The products could not be used on state highways until further study on their safety could be undertaken.

Example of a transverse crack filled with asphalt emulsion



Dynamic skid tester and British pendulum tester

British pendulum tester



Absorption testing

The Pavement Preservation Task Group (PPTG) proposed a series of test projects to re-evaluate the use of these products on travel ways. The study will require the measurement of skid numbers after application to ensure that the roads are safe for motorists. A variety of skid test equipment is being used as a part of the study. Another purpose of the test sections is to develop generic specifications for the products used for fog and rejuvenating seals based on their performance based properties. Fog and rejuvenating seals are two of many pavement preservation strategies used to defer surface degradation and extend pavement surface life. Fog seals are a mixture of asphalt emulsion and water applied

to the asphalt surface of a road, street or highway. Rejuvenating seals are a combination of various chemicals or a mixture of asphalt emulsion and recycling agents applied to the asphalt pavement surface.

To ensure successful development of the generic specifications for fog and rejuvenating seals in California, a set of performance based properties and tests are identified. The objectives of these properties and tests are:

- Assess the effectiveness of the various seals in reducing surface stiffness and long term aging.
- Determine the engineering properties that relate to the effectiveness of the rejuvenation treatment.
- Assess the penetration abilities of the rejuvenation seals into the pavement surface.
- Ensure the friction requirement in the new specification can be met within a reasonable time.
- Evaluate the effect of sanding in increasing pavement friction.



Asphalt concrete core drilling



Overview of project for scrub seal

A comprehensive work plan has been developed which includes four Caltrans Districts and about eight testing sites. The first two testing sites in D9 were already successfully implemented using different types of rejuvenating seals in June 2007.

On June 11-12, 2007, Caltrans D9 conducted scrub seal test sections on Highway 178 west of Ridgecrest, CA towards to Trona, CA. A total of six sections were constructed using two different asphalt emulsions, PASS and Styraflex.

On June 18-19, 2007, Caltrans D9 conducted rejuvenator seal tests on the Highway 58 east of Mojave, CA. Seven sections were constructed with one as an untreated control section. The six different types of asphalt emulsions used were Topien-C,

CQS, PASS-QB, Styraflex, CRF, and Reclamite. Skid tests, and ring tests were conducted on site. Cores were taken at planned locations for conducting laboratory tests, such as the Dynamic Shear Rheometer (DSR) and the Bending Beam Rheometer (BBR).

The benefits of the generic specification for fog and rejuvenating

seals will ensure the quality of the products in California. For a fog seal, it should seal the road surface and defer

surface degradation without skidding hazard. For a rejuvenating seal, it should soften the stiffness of oxidized AC pavement surface and extend the life of the pavement surface by adjusting properties of the AC mixture. Some rejuvenators contain asphalt which also seals the surface in addition to adjusting the properties of the AC mixture.



Application of fog seal



Hans Ho

## PPTG Awards Committee

By Hans Ho, Chair

**A**t future pavement preservation conferences, the PPTG has decided to present awards to agencies and individuals that have contributed to significant progress in the pavement preservation arena. The current committee for awards consists of the following:

- Hans Ho - Industry (Chair)
- Shakir Shatnawi - Caltrans
- Larry Rouen - Caltrans
- Laura Melendy - LTAP
- Gary Hicks - CP2 Center
- M. Valdez - Local Agencies

Our first task is to round out the committee membership to represent the entire state. We would greatly encourage members of public agencies, engineering consultants and contactors from Southern California to participate in the committee. We would particularly like to extend an invitation to the Green Book committee to have one of its members participate.

If you are interested, or know someone who is interested, please contact Hans Ho by e-mail at [hans.ho@telferoil.com](mailto:hans.ho@telferoil.com) or by phone at (925) 766-8530. Please contact Hans no later than Friday, September 28, 2007.

Criteria for the awards will include the following:

- Demonstrated use of pavement preservation techniques
- Documented benefit in using pavement preservation
- Significant advances in the development and use of new technologies

We are soliciting nominations for awards. Please send them to Hans Ho by October 30, 2007. The nominations will be forwarded to all members for consideration by November 9, 2007 with the goal to have a final selection by mid January, 2008. The award will be given out at the April, 2008 conference.



## Mark your calendar for these upcoming pavement preservation events



PPTG Workshop, Orange County, December 4, 2007, [www.cp2info.org/taskgroup](http://www.cp2info.org/taskgroup)

AEMA Workshop, Las Vegas, NV, November 7-8, 2007, [www.aema.org](http://www.aema.org)

AEMA Workshop, Industry Hills, CA, December 5-6, 2007, [www.aema.org](http://www.aema.org)

AEMA-ARRA-ISSA Joint meeting, San Jose el Cabo, Mexico, February 20-23, 2008

Annual CCSA pavement preservation conference, Sacramento, January 24-25, 2008, [www.chipseal.org](http://www.chipseal.org)

CEAC PWOI Spring conference, March 5-7, 2008, San Diego CA, [www.ceaccounties.org](http://www.ceaccounties.org).

Annual California Pavement Preservation Conference, April 9-10, 2008, [www.cp2info.org/conference](http://www.cp2info.org/conference)



### Coming in the next issue

City of Los Angeles pavement preservation program

Pavement preservation research

PPTG update

Benefits of pavement preservation

Preserve these ruts?

## Is it deserving preserving?

The first picture below illustrates a pavement that is a good candidate for proactive preservation techniques. The lower picture shows a roadway that is severely damaged and requires rehabilitation.





## CP2 Center news

### Bob Buckley Retires From Caltrans

**B**ob Buckley, retired from Caltrans as the Chief of Engineering Services on June 20, 2007, was a 1979 graduate of CSU, Chico from the Department of Civil Engineering. Tom Ferrara mentioned that Bob was an exceptional student while at CSU, Chico. Bob visited the Center just before his retirement and wished us well in our new endeavor.

### County Engineers Association of California 2007 Bedroll Conference

**A**pproximately 60 representatives from various counties, consulting engineering firms and industry attended the July 11-13 conference held at Camp Conery, a PG&E facility, Lake Almanor, CA.

The conference included a presentation by Clay Castleberry, former Butte County Director of Public Works. The presentation included an interesting display of historical surveying and drafting equipment.

Technical sessions were held on Thursday and included an update on the activities of the County Engineers Association of California by Peter Rei. Peter is the Public Works Director for Tuolumne County and a CSU, Chico civil engineering graduate. Other presentations included a legislative update relating to budgets and funding for public works projects in California, a presentation on the LTAP professional development courses, and new information regarding the Caltrans local assistance program.

Dr. Tom Ferrara, Director of the California Pavement Preservation Center made a presentation on the center's activities. Dr. Ferrara explained the establishment of the center at CSU, Chico and its relationship to the California Department of Transportation, the Pavement Preservation Task Group, and the Western Pavement Preservation Partnership. Dr. Ferrara described many of the current technical activities the center is involved in under the current Caltrans services contract. Each of the six major tasks (Benefits, Education, Improving Performance, Innovation, Technical Assistance, and Promotion of the Pavement Preservation concept) was covered and a progress report on each was provided to attendees.



Left to Right: Tom Ferrara, Retiree Bob Buckley, and Ding Cheng meet in front of the CP2 Center offices on the second floor of Langdon Hall on the CSU, Chico campus.

Photo: R. Gary Hicks

### WASHTO Meeting, Las Vegas July 9-12, 2007

**T**he Center participated in the WASHTO meeting held in Las Vegas from July 9-12, 2007. Gary Hildebrand and others from the pavement preservation task group (PPTG) including Bob Koleas, Scott Metcalf, Don Matthews manned the Center's booth. Others who helped include members of our patrons group (Westerns Emulsions, SemMaterials, LP) and friends of the Center including Sohila Bemanian (formerly with NDOT) and Chuck Valentine (with Valentine Construction).

The booth featured the brochures on the Center, the PPTG, and the Western pavement preservation partnership (WPPP). Distinguished visitors from Caltrans who spent time at the booth included Will Kempton, Director, and Richard Land, Chief Engineer. Both were impressed to see the booth indicating Caltrans commitment to pavement preservation.

Gary Hildebrand also indicated that representatives from several of the other western states and other agencies stopped by to learn more about Caltrans' efforts with pavement preservation and the WPPP. They were particularly interested in the following:

- Upcoming seminars and conferences.
- Role of the PPTG and what it does.
- What the Center and the PPTG can provide to others.
- Role of pavement management in supporting the preservation effort.

The benefit of having the booth at the meeting was to share what the Center and the PPTG was doing, its accomplishments and plans for the future.

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