

Status of Field Innovation Projects in California

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Presentation Content

- Overview of products used
- Definitions of products
- Number and location of products
- Benefits and limitations of products
- Performance to date
- Status of report documenting the study
- Potential future use of product



Background

- Caltrans has been using innovative products and processes on many projects
- The status of many of these products has not yet been documented
- This presentation is to identify and provide a summary on the innovative products and processes used



Thanks to the Champions

- All information included in this presentation were provided by the various PPTG subtask groups
- The discussion contains only the main points for each product evaluated
- Thanks are due for the timely response and input from many individuals



Types of Products Used

- RAC-O-HB and RAC-O
- European Gap Graded Rubber Low Noise Mix
- Thin bonded wearing courses, Type O
- Microsurfacing
- Interlayer test section – District 2
- AR Chip seal test sections – District 11
- Cold Central Plant Mix
- Crack/Joint Sealing
- Others planned
 - **Surface recycling**
 - **Warm mixes**
 - **Verglimit**



RAC-O-HB

- RAC-O-HB has been used in CA since 1999
 - It contains up to 10 % binder in the mix
 - The mix is known for its durability and noise reduction
 - It does not reduce splash and spray because of its low permeability (void contents are less than 5 %)
- It is widely used in AZ as a thin surface mix to
 - Increase durability
 - Reduce noise on concrete pavements
 - Reduce reflection cracking



RAC-O

- RAC-O has been used in CA since 1995
 - It contains up to 7-8 % binder
 - Void contents can be up to 15 %
 - Benefits include reducing splash and spray
- Product is similar to OGAC
 - Costs more
 - Performs longer
 - Quieter



RAC-O-HB Projects (Update)

Project	PM	Lane Miles	Date Const	Current Condition
SAC 99	21.6-24.6	3 miles	1999	
FRE 5	0-38	165	1/00	Good
TUL 65	21.9-29.6	7.7 miles		
TUL 99	0-25	100	10/02	Good
SBD 40	3-15	112	7/02	
SBD 40	73.4-89.5	112	7/02	
MONO 395	76.0-84.5	8.5 miles	2000	Small cracks Perform well
MONO 395	106.3- 108.0	1.7 miles	2000	Small cracks Overlaid ARGG

RAC-O and RAC-O-HB

Future Plans and Questions

- Where should they be used?
- What are the costs and estimated lives of the treatment?
- Do they perform better than OGAC?
- Can they be used on concrete pavements in CA?
- Are there problems that need to be addressed?



European Gap Graded District 7

- European Gap Graded - Rubber Aggregate - Low Noise Mix
- Hwy 19 South El Monte Placed Fall 2005
- Replacement of No 8 aggregates with Dry Rubber $\frac{1}{2}$ inch mix
- UC Davis is monitoring in Noise Study



Thin Bonded Wearing Courses

- Types used in CA
 - Gap-graded with PMA
 - Open-graded with PMA
 - Open-graded with AR
 - Gap-graded with AR (planned for 2007)
- The mix is typically placed at 20 mm or less depending on gradation
- Have been used in CA since 1998



NSSP's

- Now available for all products
- Developed by the PPTG
- Available from the sub-group on thin bonded wearing courses (39-700)



BWC Projects

- Where are they located?
 - 18 projects on state owned highways
 - 24 projects on city or county routes
 - Also used on Echo Summit (Rt. 50, high elevation)
 - Date constructed from 1998 – 2006; average 4-5 projects/year
 - Cost info not available
- Minor construction problems encountered in early years due to contractor's unfamiliarity with the process
- Current performance
 - All are performing well

Thin BWC

Planned Future Use and Questions

- What is the expected life of the treatments?
 - Average 10-15 years
 - Some still performing
- What are the benefits of using the products?
 - Improved skid resistance
 - Corrects the profile
 - Fast application, quick return to traffic
 - Superior bonding and sealing existing surface
 - Reduced noise



District 2 Test Sections

- Purpose of study - to evaluate the performance of different interlayers over badly distressed pavement
- Interlayers evaluated (approximately 0.9 CL lane miles each)
 - Modified binder asphalt
 - Poly/fiberglass fabric
 - AR chip seal
 - PME chip seal
- Entire project overlaid with 25mm RAC-G



District 2 Test Sections

- Location
 - SR 36, LAS
 - MP-14.2 to 18.3
 - Constructed during the summer of 2006
 - Some problems during construction
- Performance to date - excellent and crack free



District 2 Test Sections

- Future monitoring plan - track performance over the next 10 years
- Initial report -12/07
 - Findings
 - Lessons learned
 - Other
- Future reports - every 2 years after 12/07



District 11 Test Sections

- Purpose of study - to evaluate enhanced PG asphalt rubber chip seals in hot climates under heavy truck loads
- Evaluated different AR chip seals
- Constructed in the summer 2005



District 11 Test Sections

Type	Binder	Rates (gal/sy)	Gradation
1	AR4000	0.50	Section 37 coarse aggregate
2	AR4000	0.50	New ½" coarser aggregate. A more uniform and one sized rock for more voids and improved performance
3	PG 70-10	0.50	
4	PG 70-10	0.55	
5	PG 70-10 (no ext. oil)	0.55	
6	PG 70-10	0.60	

District 11 Test Sections

- Field construction
 - No problems were encountered during construction of test sections. All binder spread rate were verified by weigh backs.
- Current performance
 - All test sections are performing significantly better than the original project product on Route 86.
- Study report
 - A report on the performance of the test sections is expected in 2007.



Crack/Joint Sealing

- Test Methods
 - Softening point
 - Cone penetration
 - Resilience
 - Flex test
 - Viscosity
 - Tensile adhesion
- Specification



Microsurfacing

- Microsurfacing is a chemically breaking slurry seal that includes polymer modified binders
- Developed in Europe (micro-asphalt concrete)
 - Good surface frictional properties
 - Fast application, return to traffic within 1 hr
- New NSSP's have been developed - used on 15 projects
- 3 projects placed in 2006
 - 2 on highway 76 in District 11
 - 1 near Lake Tahoe



Microsurfacing

- Construction
 - Can be placed in night time
 - Had workmanship issues at joints in early year (2001)
- Performance to date
 - Early project (2001) shows sign of distress (project experiences 70-80,000 ADT)
 - Newer projects are performing well
 - Expected life: average 7 years
- Future plans
 - Task group to review all projects placed
 - Plan to construct more projects with new specs using continuous machinery to eliminate problems at joints



Other Products to be Evaluated by Caltrans

- Surface recycling
 - Hot in-place
 - Cold in-place
- Warm mixes - thin HMA placed at lower mix and compaction temperatures
 - Several processes being evaluated nationwide
 - Potential benefits are energy savings
- Verglimit
 - Encapsulated calcium chloride pellets
 - With pavement wear, the pellets are exposed
 - Used to deice pavements



Surface Recycling

- Hot in-place
 - Techniques to be evaluated
 - Projects to be placed
 - District 2, FY 07/08
- Cold in-place
 - Techniques to be evaluated
 - Projects to be placed
 - District 3, Colusa PM 3.4/7.3, FY 07/08
 - District 11, FY 07/08



Surface Recycling District 11

- Cold Central Plant Mix
- Constructed in Spring 2006
- Utilized a Rubberized Asphalt Emulsion and Cement. Two day project.
- First day compaction and binder content were not adequate and didn't meet specification
- Second day new equipment was brought in and binder content increased with better performance.



Warm Asphalt Mixes

- Background
 - Mixes manufactured and placed at lower temperatures
 - Additives are used to allow this to happen
 - Potential benefits - energy savings and reduced emissions
- Projects placed in CA
 - District 4?
- Plans for future use
 - District 1, FY 07/08
 - District 5, FY 07/08



Verglimit

- Where to use - areas prone to icing
 - bridge decks
 - steep grades
 - sharp curves
 - shaded roads
- Plans for use
 - District 3, FY 06/07
 - Need NSSP



Other Products

- Did we forgot any new and innovative products?
- If so, let us know what they are
- This is a living document and we will update this presentation to include any other products

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Innovation Process

- Pre-Proposal
 - Title, contact info, description, benefits, selection criteria, specs, and background
- Proposal
 - Project location, costs, potential problems, warranty, safety, evaluation plan, and definition of success
- Construction Report
- Final Report Format
 - Evaluation results, performance analysis, life cycle cost, conclusions, and recommendations

Available from the innovation sub-group of the PPTG

Summary

- Numerous innovative products have been used in CA
- Have we captured the most important?
- If not what else should be included in the progress report?
- Innovation process is available from Joe Holland or Scott Metcalf

