City and County Pavement Improvement Center (CCPIC)

By
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Program Manager, CP2 Center
Presented to
Maintenance Superintendents Association (MSA)
May 21, 2020
Welcome To CCPIC

- Sponsored by League of California Cities, County Engineers Association of California, and California State Association of Counties
- Chartered 28 September 2018

www.ucprc.ucdavis.edu/ccpic
Agenda

• Welcome and Introductions
• CCPIC
  – Mission and Vision, Scope, Organization
  – Certificate Program
  – Planned Certificate Curriculum and New Course Development
  – Deliverables
• Technical Presentation- MTI surface treatment manuals
  – Chip seals
  – Slurry Surfacings
  – Cape Seals
  – Thin Asphalt Overlays (coming soon)
• Questions and Answers
CCPIC Mission and Vision

• Mission
  – CCPIC works with local governments to increase pavement technical capability through timely, relevant, and practical support, training, outreach, and research

• Vision
  – Making local government-managed pavements last longer, cost less, and be more sustainable
Academic Partners

• University of California Partners
  – University of California Pavement Research Center (lead), administered and funded by ITS Davis
  – UC Berkeley ITS Tech Transfer, administered and funded by ITS Berkeley

• California State University Partners
  – CSU-Chico, CSU-Long Beach, Cal Poly San Luis Obispo
  – Funding partner: Mineta Transportation Institute, San Jose State University
CCPIC Organization

• Governance:
  – Chartered by League of California Cities, California State Association of Counties, County Engineers Association of California, also provide staff support
  – Governance Board consisting of 6 city and 6 county transportation professionals

• Current Funding
  – Seed funding for CCPIC set up and initial activities from SB1 funding through the ITS at UC Davis and UC Berkeley, and Mineta Transportation Institute at San Jose State University
CCPIC Scope

• Provide technology transfer through on-line and in-person training, peer-to-peer exchanges, and dissemination of research results and best practices in a variety of formats for a variety of audiences

• Develop technical briefs, guidance, sample specifications, tools, and other resources based on the latest scientific findings and tested engineering solutions for local agencies to use.
CCPIC Scope

• Serve as a resource center for up-to-date information, regional in-person training, pilot study documentation, and forensic investigations

• Conduct research and development that produces technical solutions that respond to the pavement needs of both urban and rural local governments
Deliverables
CCPIC Training: Certificate Program

• Pavement Engineering and Management Certificate Overview
  – For engineers, asset managers, upper-level managers, technicians and construction inspectors
  – 92 hours of training
    • 60 hours in core classes, 32 hours elective
    • Majority of classes to be offered online
  – In four categories:
    • Pavement Fundamentals
    • Pavement Management
    • Pavement Materials and Construction
    • Pavement Design
# CCPIC Training: Certificate Curriculum

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CCPIC Training

www.techtransfer.berkeley.edu/training/pavement-courses

- So far, 10 classes held and over 600 people trained, at just $75 per person
- Most classes offered online to save agency personnel time and money
- CCPIC has developed an all new training curriculum and certificate program for pavement engineering and management. New classes rolling out in 2019-2021.
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Best Practices

• Current
  – Asphalt Compaction Sample Specifications
  – Concrete Specs for Durability and Sustainability
  – LCCA pilot project
  – Unpaving to Create Affordable, Safe, Smooth Gravel Roads
• Expected Completion Dates-later this summer
Best Practices

• Planned
  – Pavement Condition Index (PCI)
    • A technical brief describing how PCI is measured, what it doesn’t measure, and how similar or same PCI may have different implications for pavement preservation and pavement rehabilitation strategies.

  – Superpave Lite
    • Lead the development of specifications in Caltrans and Greenbook format for a Superpave specification for use by local agencies.
    • Act as the liaison to the Greenbook Committee’s Asphalt Concrete Task Force initiative to convert current Hveem mixes to Superpave.
Best Practices

• Planned
  – Converting Hveem to Superpave
    • The Greenbook ACTF has initiated “round-robin” testing of three different Hveem mixes to equate the number of gyrations needed to produce a mix with 3% air voids.
    • Essentially, a simplified conversion from Hveem to Superpave. Results to date have been inconsistent.

  – CCPIC Support:
    • Review test protocols and procedures. Make recommendations for changes as necessary.
    • Review and interpret test results.
    • Provide guidance and recommendations throughout the process.
Best Practices

• Local Agency Survey
  ➢ Working through LOCC/CEAC, conduct a survey of local agencies on the use of Superpave, interest in a Superpave specification, RAP, warm mix, and other subjects. Develop a contact list of each Agency’s “go to” person. Results will provide insight and serve as a basis for future CCPIC initiatives.
  ➢ **Interested** in being on the “Go to” list? Send an email to: eupdyke@ucdavis.edu
Tools Developed

- Life Cycle Cost Analysis (LCCA) Comparison Spreadsheet
- Unpaved Road Chemical Treatment Selection
- Asphalt Paving Compaction Temperatures
CCPIC LCCA Excel Tool

- Excel tool to calculate Net Present Value, Salvage Value and Equivalent Uniform Annual Cost
- Can compare 3 scenarios side by side
- Can choose and edit the list and sequence of treatments

Download at: http://www.ucprc.ucdavis.edu/ccpic/ or Google “CCPIC UCPRC”
Cost-Effective Strategies:
Use PMS Data And Life Cycle Cost Analysis

- Understanding performance of your pavements is key to good pavement management and life cycle cost analysis (LCCA)
  - Performance estimates are typically in terms of pavement condition index (PCI)
  - Agencies need to go one step behind PCI to understand performance, can do this themselves

Figure B.4 PMS Software Used By Cities And Counties

Local Streets and Roads 2018
Outreach

- Several presentations in local agency settings already and more planned
- Peer-to-peer network being developed
- Regional centers for resources
  - Northern California- CP2 Center at CSU Chico
  - Central California- San Luis Obispo
  - Southern California-Long Beach State
- Pavement training
- Best practices technical briefs
- Tools
- Unpaved roads
- Peer-to-peer
How to Get Involved?

- Get your organization to take training
- Host in-person training classes
- Read the tech briefs and see if your agency can benefit
- Get involved with governance board
- Start a peer-to-peer chat group
- Take a look at the tools on the website
Any Questions

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http://www.ucprc.ucdavis.edu/ccpic/
Manuals for Surface Treatments Commonly Used by Local Agencies

- Completed in 2019 and available on MTI’s website
  - Chip Seals
  - Slurry Surfacings
  - Cape Seals
- Final Draft Under Review (May 2020)
  - Thin Asphalt Overlays (soon to be published)
- These manuals are designed to be the “Go To” for local agencies from project selection through construction.
Chip Seal Manual

Contents
- Project selection
- Types of chip seals
- Design process
- Construction
- Quality Assurance
- Troubleshooting

Presentations
- 1 hour
- 3 hours

What is Chip Seal?

- Application of an asphalt binder on existing pavement followed by a layer of aggregate chips.
- Treatment is then rolled to embed the aggregate into the binder.
- This may be followed by a emulsion flush coat.
Why Use Chip Seals

- Performance
  - Typical treatment life: 4 to 7 years or more
- Typical cost
  - $2.50 to $5.00/yd^2 or more
  - Depends on the type
Where to Use Chip Seals?

- Surface for light to medium traffic (ADT<30,000)
- Waterproofing layer
- Skid resistant surface
- Restores weathered surface
- Defines shoulders
When NOT to Use!

- Structurally deficient pavements
- Cracks >1/4 in wide
- Large number of potholes
- Over a bleeding pavement
- Rutting >1/2 in
- Very rough surface
- Areas of high bicycle traffic
Chip Seal Variations

- **Applications**
  - Single chip seals
  - Double or triple chip seals
  - Cape seals
  - Geotextile reinforced chip seals (GRCS)
  - Scrub seals

- **Asphalt Binder Types**
  - Polymer modified emulsion (PME)
  - PMA (Hot applied)
  - AR (Hot applied)
  - Terminal blends (Hot applied). Not currently available
Chip Seal Variations: Fabric and Chip Seals
Chip Seal Variations: Scrub Seal

Uses PMRE as binder to help “heal” small cracks
Slurry Surfacing Manual

Contents
• Project selection
• Types of Slurry Surfacing
• Design process
• Construction
• Quality Assurance
• Troubleshooting

Presentations
• 1 hour
• 3 hours

A mixture of graded aggregate and bituminous binder with fillers and additives to make a cold mixed material that cures quickly to a hard wearing surface.
Why Use Them?

- They are a thin, cost effective preventative maintenance treatment.
- They are used on asphalt pavement or concrete pavement that are showing distresses.

Slurry Surfacing  
Completed Project
Project Selection for Slurry Seals

- Correct/improve
  - Raveling and weathering
  - Skid resistance
  - Small Cracks and voids
  - Aesthetics
- Prevent/reduce
  - Oxidation of asphalt concrete
  - Surface water infiltration
  - Pavement degradation due to the elements
- Usually a daytime application
Project Selection for Microsurfacing

- **Correct/improve**
  - Raveling and weathering
  - Skid resistance
  - Aesthetics
  - Fill minor rutting
  - Small Cracks and voids

- **Prevent/reduce**
  - Aging/oxidation of asphalt concrete
  - Surface water infiltration
  - Pavement degradation due to the elements
  - Can be day or night application
Don’t use on severely distressed pavements

- Potholes
- Severe alligator problems
- Structurally deficient pavements
- Severe rutting
- Significant profile or cross-slope corrections

These problems require repair work prior to slurry surfacing

- Dig out and repair potholes and severe alligator problems
- Pre-level severe rutting and cross-slope corrections
- Crack seal
Place a slurry surfacing treatment prior to the pavement reaching a PCI of less than 80.

Pavement Condition Index Classifications
Designed mixture using:

- Asphalt Emulsion
- Aggregate
- Additives and fillers
- Water
Cape Seal Manual

Contents
• Project selection
• Types of Cape seals
• Design process
• Construction
• Quality Assurance
• Troubleshooting

Presentations
• 1 hour
• 3 hours

What Are Cape Seals?

- Developed originally in Capetown and they consist of two layers.
- The first layer consists of an emulsion chip seal or a hot applied chip seal.
  - The emulsion binders can be conventional or polymer modified.
  - The hot binders are generally asphalt rubber, but could also be a rubberized asphalt.
- The chips are generally ½ to ⅜ inch rock, of uniform size and good quality.
The second layer is a slurry surfacing mixture of graded aggregate and asphalt emulsion binder with fillers and additives to make a cold emulsion mixture which cures quickly to a hard wearing surface.

It can be either a micro surfacing or slurry seal
Completed Cape Seal
Why use them?
- A thin, cost effective preventative maintenance treatment.
- Extends the life of the pavement

Where to use them?
- Normally on asphalt pavement, but have been used on concrete pavements showing some distresses.
- They may also trigger ADA work
When to use them?

- **Correct/improve**
  - Raveling and weathering
  - Skid resistance
  - Small non-load related cracks and voids for emulsion cape seals
  - Load related cracks in a stable pavement for AR cape seals

- **Prevent/reduce**
  - Oxidation of asphalt concrete
  - Surface water infiltration
  - Pavement degradation due to the elements

- Usually a daytime application for slurry seal as a top layer, or may be nighttime for microsurfacing
Selection of a Cape seal project is based on the structural soundness of a pavement and the types of distress that are present. Cape seals provide:

- Improved Skid Resistance: Cape seals provide good skid resistance.
- Good Durability: They wear well and can have long service lives.

Cape seals are typically constructed rapidly and cause less disruption to the traveling public than HMA overlays that take longer.
Project Selection

- Don’t use on severely distressed pavement
  - Potholes
  - Severe alligator problems - can be treated with only AR cape seals over stable pavement
  - Structurally deficient pavements
  - Severe rutting
  - Significant profile or cross-slope corrections

- These problems require repair work prior to Cape seal surfacing.
What kind of distresses can Cape seals fix?

- An AR cape seal can handle more severe distresses than a single chip seal or a single slurry surfacing.

After 8-years this AR cape seal is still performing.

This is a cape seal at the City of Lompoc, CA.
Cape Seal Variations

Microsurfacing Can Be Used As A Scratch Coat For Rut Filling. Figure Shows A Multi-layer Cape Seal With Rut Filling.
Thin Asphalt Overlay Manual: Coming Soon

Contents
- Project selection
- Types of thin overlays
- Design process
- Construction
- Quality Assurance
- Troubleshooting

Presentations
- 1 hour
- 3 hours
Thank You

Questions

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