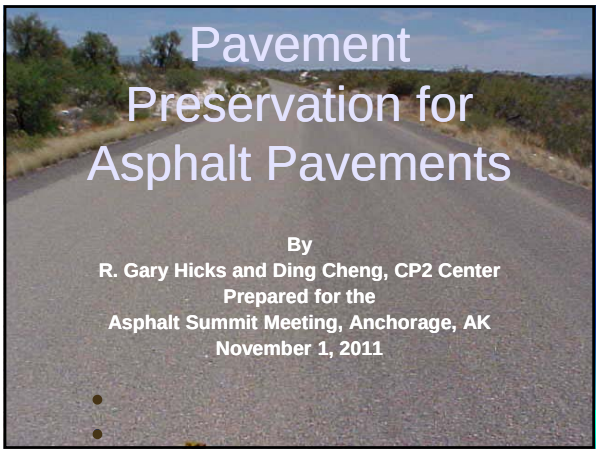


Background

- The Problem
  - Too many roads
  - Not enough funds
- The Opportunity
  - A sound pavement preservation program to optimize paving funds
  - Securing dedicated funding

Background-continued

- Funding situation
  - Need for change
  - Existing system seems to be broken
- Challenges
  - Competing needs
    - Managing our assets
    - Capacity issues
    - Safety
  - How to prioritize?

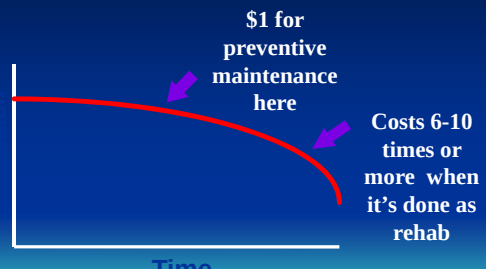
The Solutions

- Using Pavement Preservation Concepts
  - Surface Seals
  - Thin HMA overlays
- Using new or improved technologies
  - Thin bonded wearing courses
  - Warm mix technologies
  - In-place surface recycling

Pavement Preservation Concept

- Overview
  - When, where, what
  - Choosing the right treatment
- Better use of existing and improved technologies

Effective Pavement Preservation



Scope of Presentation

- Types of Treatments
  - Materials Used
  - Design & Construction Considerations
  - Keys for Success
- Alaska Project on Pavement Preservation
- Marketing Pavement Preservation Concepts

Types of Pavement Preservation Treatments

- Fog and Rejuvenating Seals
- Chip Seals
- Slurry surfacings
  - Slurry Seals
  - Microsurfacings
- Cape Seals
- Bonded Wearing Courses
- Thin HMA overlays

Fog and Rejuvenating Seals

- Purpose - enriches dry pavement surfaces, reduces raveling, and locks in chips on chip seals
- Materials - diluted asphalt emulsions or a specialty product
- Design considerations - application rate a function of surface condition
- Construction- applied using a distributor truck in diluted form

Keys for Success

- **Use the right emulsion - normally slow setting ones**
- **Dilute the emulsion at least 1 to 1 with water**
- **Apply at the correct rate and never over apply**
- **Apply in good weather conditions**

Fog/Rejuvenating Seals

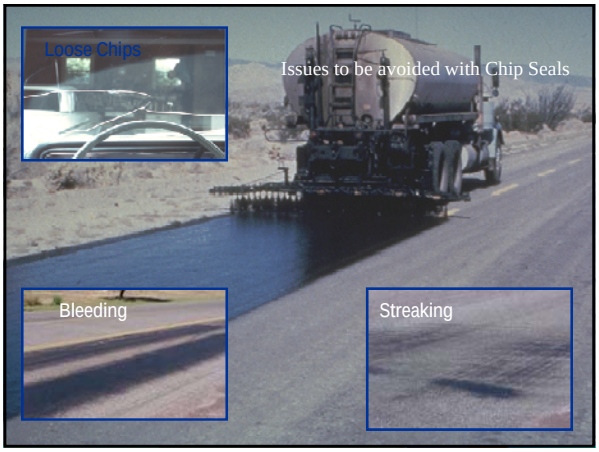
Chip Seals

- **Purpose - waterproof the existing surface and improve texture. Can also serve as an interlayer**
- **Materials - application of emulsions or hot binders followed by clean aggregate**
- **Design - application rates need to be determined**
- **Construction - asphalt is applied followed by an application of aggregate. May be used in multiple layers**

Keys for Success

- **Proper surface preparation**
- **Use the right binder and clean aggregates**
- **Determine the appropriate spread rates for the binder and the aggregate**
- **Follow the construction specs, including the need for traffic control**
- **Chip seal in good weather conditions**

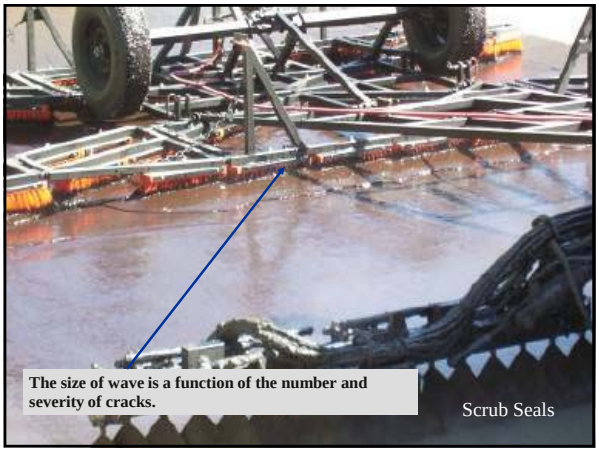
Chip Seals

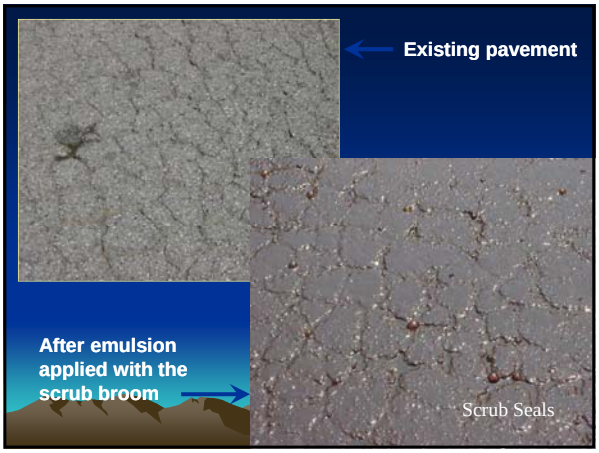


Scrub Seals

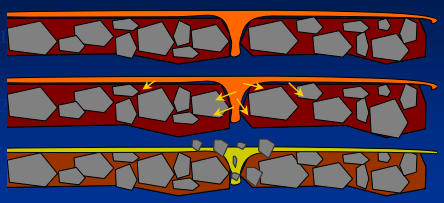
- **Chip seal with a polymer modified rejuvenating emulsion (PMRE)**
- **A scrub broom is used to push the emulsion into the cracks**
- **Rejuvenates as it seals the pavement surface**


Scrub Seals


The size of wave is a function of the number and severity of cracks.
Scrub Seals


Existing pavement
After emulsion applied with the scrub broom
Scrub Seals

How PMRE Works



1. Filling cracks and voids, including those that cannot be seen with the unaided eye
2. Rejuvenate existing asphalt
3. Forms a reflective crack membrane between existing pavements and future overlays or seals. This membrane is called a stress absorbing membrane interlayer (SAMI).

Scrub Seals

Slurry Seals

- Purpose - seals minor cracks, restores surface texture, mitigates raveling
- Materials - a mixture of graded aggregate, asphalt emulsion (generally polymer modified), and setting agents
- Design Considerations - special mix design is needed
- Construction - applied using a special paver mounted on a truck

Keys for Success

- Proper surface preparation
- Place on structurally sound pavements
- Perform a mix design using the project materials
- Make sure the equipment is working properly and is calibrated for the materials being used
- Proper workmanship and application techniques
- Keep traffic off until the seal is cured to avoid "tracking"

Slurry Seals

Slurry Seal - When is it used?

Type		
I	II	III
Crack Filling Fine Seal	General Seal Medium-Textured Surface	Rough - Textured Surface
Parking Lots Residential Streets Airfield Runways	Urban Streets	Primary Highways

Microsurfacing

- **Purpose - seal the surface, fill wheel ruts and minor surface irregularities, and can be placed at night**
- **Materials - a mixture of graded aggregates, polymer modified emulsion, and set additives**
- **Design considerations - requires a mix design to determine the proportion of components**
- **Construction - applied using a special truck mounted mixing/paving machine. For long straight jobs a continuous machine is recommended**

Keys to Success

- **Proper surface preparation**
- **Place on clean sound pavements**
- **Perform a mix design using project materials**
- **Control the rate of break**
- **Use continuous paving equipment to minimize joint problems and ensure machine is calibrated with job materials**
- **Minimize handwork**

Microsurfacing

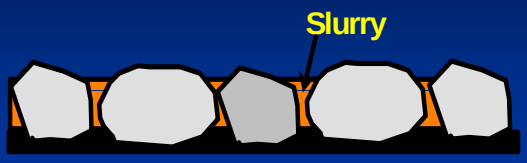
Continuous Machine

Microsurfacing

Cape Seals

- Purpose - seal the surface and provide a smooth hard wearing surface
- Materials - a chip seal followed by a slurry seal
- Design considerations - mix designs for both products
- Construction - application of a chip seal followed by a slurry seal

What is a Cape Seal?

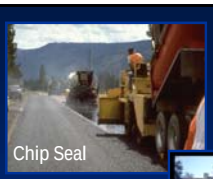


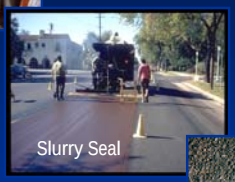
Chip Seal Followed by a Slurry

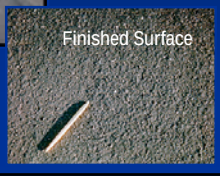
Keys for Success

- Design each application
- Use materials which meet the spec
- Clean the existing surface
- Follow the construction guides
- Do not allow traffic on too quickly
- Use appropriate binder in chip seal based on severity of distress

Proper Method

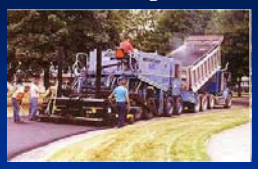

Chip Seal


Slurry Seal


Finished Surface

Thin Bonded Overlays

- Application of polymer modified binder immediately followed by a thin hot mix overlay
- Total thickness has been about one inch
- Applied with a spray paver



Thin HMA Overlays

- Types
  - Conventional
  - Polymer modified asphalt
  - Asphalt rubber
  - Terminal Blends
- Thickness - 1.5 to 2 inches
- Used with warm mix additives

Typical Lives of Treatments

Preservation Treatment	Estimated life, years
Crack Seals	3-8
Fog seals	2-5
Chip seals	3-10
Slurry Seals	3-7
Microsurfacing	3-9
Thin HMA Overlays	5-12

Typical Costs of Treatments

Preservation Treatment	Estimated cost, $/yd2
Crack Seals	--
Fog and rejuvenating seals	0.40 to 0.60
Chip seals	2.00 to 4.00
Slurry Seals	1.00 to 2.00
Microsurfacing	1.50 to 3.00
Thin HMA Overlays	3.00 to 6.00

Summary: Pavement Preservation

"Strategy including all activities to provide & maintain serviceable roadways"

- Lower life cycle costs
- Higher quality pavements
- Keeping good pavements good
- Greener solutions

Alaska Research Project on Pavement Preservation

- Purpose
  - Develop the framework for a pavement preservation program for Alaska
  - Develop guides and tools for the implementation of the pavement preservation program

Research Team

- Angela Parsons - ADOT & PF
- Steve Saboundjian - ADOT & PF
- Jim Horn-ADOT & PF
- Jenny Liu - UAF
- Hannele Zubeck - UAA
- Anthony Mullin – UAA/UAF
- Billy Connor - AUTC

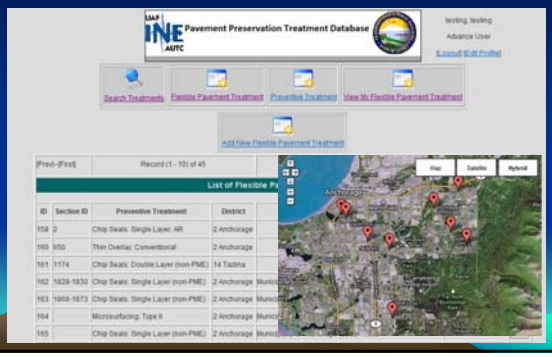
Deliverables

- Develop a Roadmap for establishing a pavement preservation program and indicate how it fits into the Asset Management program
- Develop a state of the practice on pavement preservation treatments used in cold regions.
- Develop a pavement preservation database for the State of Alaska. The database can be found at the following website: https://sites.google.com/site/alaskap2/

Major Functions of the Pavement Preservation Database

- Promote technology transfer and share project experience among AK DOT&PF, local agencies and others
- Capable of storing multiple year surveys and show the long term performance and benefits of pavement preservation treatments
- Google Mapping function to display project locations and environment
- Life Cycle Cost Analysis to support cost effective strategy selection including preservation

Pavement Preservation Database

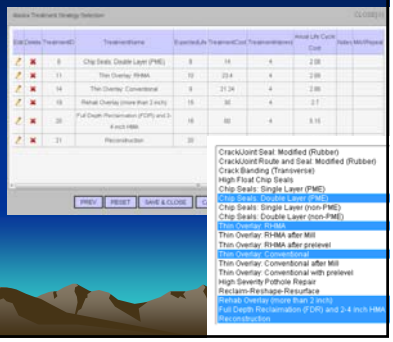


Deliverables - Continued

- Develop performance models for cold region pavement preservation treatments. This is being accomplished using the Alaska pavement management systems.
- Develop a Strategy Selection process for pavement preservation treatments. This has been accomplished and is included in the pavement preservation database. It makes use of the expected lives and costs of the various treatments used in Alaska

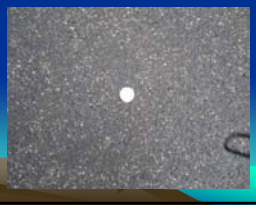
Strategy Selection Program

- Integrated with pavement preservation Database
- Life Cycle Cost Analysis
- Based on AK DOT treatment selection matrices



Preservation Treatments Used in Alaska

- Thin Hot mix overlays (mill and fill)
- Slurry surfacings (slurry seals and microsurfacings)
- Chip seals
- Bituminous surface treatments for aggregate roads
- Crack sealing



Deliverables - continued

- Recommend a process for incorporating the pavement preservation efforts into the Alaska pavement management system.
- Develop a guide for when and where to use preservation treatments in Alaska.
- Provide guidance on how to implement pavement preservation in Alaska (see brochure).

Project ends on December 31, 2011

Summary

- **Types of Pavement Preservation Treatments**
  - **Design and construction considerations**
  - **Keys for Success**
  - **Expected lives**
- **Status of the Alaska Pavement Preservation Research project**
  - **Objectives**
  - **Deliverables**
  - **Marketing Preservation (see brochure)**

Questions

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