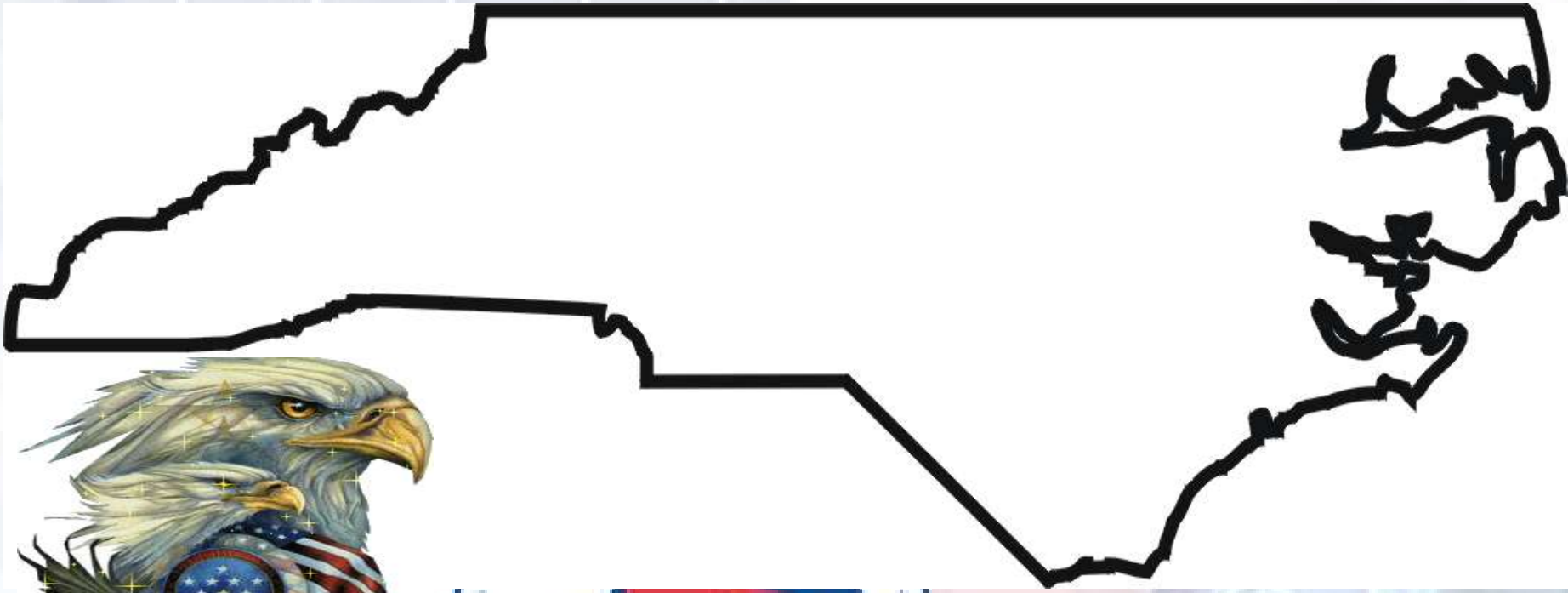
Pavement Preservation

By Dennis Wofford



The National Center for Pavement Preservation (NCPP) was established by Michigan State University and the Foundation for Pavement Preservation (FP-2) to lead collaborative efforts among government, industry, and academia in the advancement of pavement preservation. Its purpose is to advance and improve pavement preservation practices through education, research and outreach. The vast highway system of the United States of America, is steadily deteriorating despite best efforts to keep up with ever present reconstruction needs. In response, efforts should be made to "preserving" highway pavements. This redirection must be done to restore a sustainable balance in the resources needed for maintaining the highway system at a high level of service, and reduce the need for and frequency of reconstruction and rehabilitation.

FOUNDATION OR PAVEMENT PRESERVATION

A good highway system is a critical component of a healthy economy and essential for global competitiveness. Our country's economic vitality depends on its highways to move people, goods and services, 24 hours a day, 7 days a week. To serve its purpose, our highway system must be in good physical condition and provide a high degree of connectivity and efficiency.

ROI – Every $1.00 spent on pavement preservation will save from $6.00 to $10.00 or more in rehabilitation/reconstruction costs.

On average, pavement preservation projects support approximately 25% more jobs on a dollar for dollar basis compared with new construction or rehabilitation projects.

Pavement preservation is socially responsible and Eco-friendly. It utilizes up to 80% less of the earth's non-renewable resources than highway rehabilitation and reconstruction programs.

Memorandum

Subject: **ACTION:** Pavement Preservation Definitions

From: David R. Geiger, P.E.

Director, Office of Asset Management

As a follow-up to our Preventive Maintenance memorandum of October 8, 2004, it has come to our attention that there are differences about how pavement preservation terminology is being interpreted among local and State transportation agencies (STAs). This can cause inconsistency relating to how the preservation programs are applied and their effectiveness measured. Based on those questions and a review of literature, **we are issuing this guidance to provide clarification to pavement preservation definitions.**

Pavement preservation represents a proactive approach in maintaining our existing highways. It enables STAs to reduce costly, time consuming rehabilitation and reconstruction projects and the associated traffic disruptions. With timely preservation we can provide the traveling public with improved safety and mobility, reduced congestion, and smoother, longer lasting pavements. This is the true goal of pavement preservation, a goal in which the FHWA, through its partnership with States, local agencies, industry organizations, and other interested stakeholders, is committed to achieve.

NCDOT

OUR MISSION

Connecting people and places in North Carolina – safely and efficiently, with accountability and environmental sensitivity

OUR GOALS

Pavement Preservation !

- **Make our transportation network safer**
- **Make our transportation network move people and goods more efficiently**
- **Make our infrastructure last longer**
- **Make our organization a place that works well**
- **Make our organization a great place to work**

Pavement Preservation "Definition"

Pavement preservation is a program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety and meet motorist expectations.

ncpp

MICHIGAN STATE UNIVERSITY


Midwestern
Pavement Preservation Partnership
MPPP


Northeast
Pavement Preservation Partnership
NEPPP


Rocky Mountain West
Pavement Preservation Partnership
RMWPPP


Southeast
Pavement Preservation Partnership
SEPPP

14 State Agencies

Alabama Department of Transportation
Arkansas Department of Transportation
Florida Department of Transportation
Georgia Department of Transportation
Kentucky Transportation Cabinet
Louisiana Department of Transportation
Mississippi Department of Transportation
North Carolina Department of Transportation
Oklahoma Department of Transportation
South Carolina Department of Transportation
Tennessee Department of Transportation
Texas Department of Transportation
Virginia Department of Transportation
West Virginia Department of Transportation

Suppliers / Contractors
BASF Corporation
Colas Solutions, Inc.
Ergon Asphalt & Emulsions, Inc.
Gallagher Asphalt Corporation
Geotech Services, Inc.
Kraton Polymers, LLC
Skidabrader
Slurry Pavers, Inc.
Strawser Construction, Inc.

Consultants
Agile Assets, Inc.
HAKS, PC
Pavement Technology, Inc.
Road Science, LLC

Other
American Concrete Pavement Association
FP2, Inc.

PAVEMENT PRESERVATION

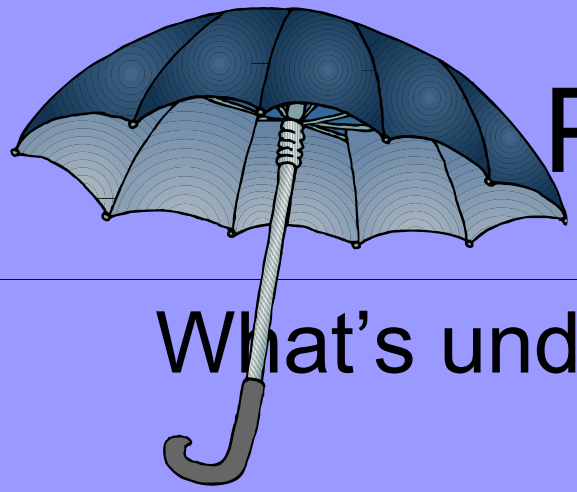
involves minimizing the destructive effects of water infiltration, climate and traffic by the timely application of cost effective treatments to the pavement.

JUST LIKE CHANGING YOUR OIL

- DOESN'T IMPROVE THE OVERALL CONDITION OF YOUR VEHICLE

- DOES EXTEND THE LIFE OF THE VEHICLE

Pavement Preservation



What's under the umbrella ?

- Sustainable Financing
- Long Term Network Planning
- Cost Effective Decision Making
- Pavement Management System
- Preventive Maintenance
- Optimization by using these five items

PAVEMENT PRESERVATION

- MANAGING OF ASSETS
  - Protect Investment
  - Enhance cost effectiveness treatments

  PREVENTATIVE / PLANNED MAINTENANCE
  - Extend Pavement Life
  - Retard Deterioration

  Enhance Pavement Performance
  - Improve Functional Condition (friction, etc.)

  Reduce User Delays

Why Pavement Preservation ?

Cost Effective: Save $$$ Every dollar spent on Preservation will save $6 to $10 or more in Rehabilitation/Reconstruction Cost

Planned Approach vs. Reactive

Environmentally Friendly (Green)

Fewer Construction Delays – Less disruptions to traveling public

Keeping good roads in good condition is cheaper than a “worse first” approach

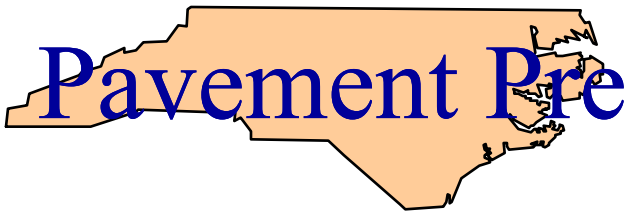
Results in smoother and safer roads

Win ! Win ! Win !

PRESERVATION TREATMENT SELECTION

Preservation Philosophy is the "Right" Treatment, on the "Right" Road, at the "Right" Time!!!!

- Selected Treatment Appropriate to condition at time of application - **(RIGHT TREATMENT)** Factors are existing pavement type, roughness, texture, distresses, drainage, climate, traffic, noise, etc.
- Structurally Sound Pavements ONLY **(RIGHT ROAD)**
- Apply treatments before Structural Damage Occurs **(RIGHT TIME)**
- **It is all about "LIFE EXTENSION" of the roadway**
- **The goal of NCDOT is to treat 10% of our roads annually !**

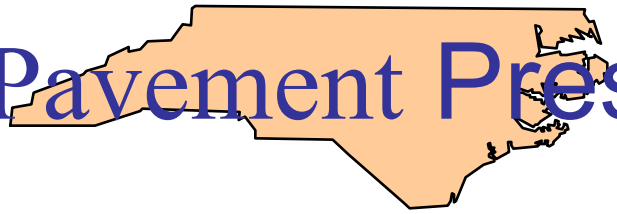


Pavement Preservation in North Carolina

Why did we decide to implement this strategy?

- **Observed the Success of other State programs**
- **Losing ground with current strategy of 'Worst First'**
- **Industry and Force Account expertise availability**
- **Quality and availability of materials**
- **Preservation strategy will save money over the long term**
- **Increased support from top management and the legislature for maintenance funding**

And lastly>>



Pavement Preservation in North Carolina

- **Significant % of our system roads are candidates for preservation techniques**

North Carolina DOT maintains the second largest state roadway system in the United States, consisting of 80,000 miles.

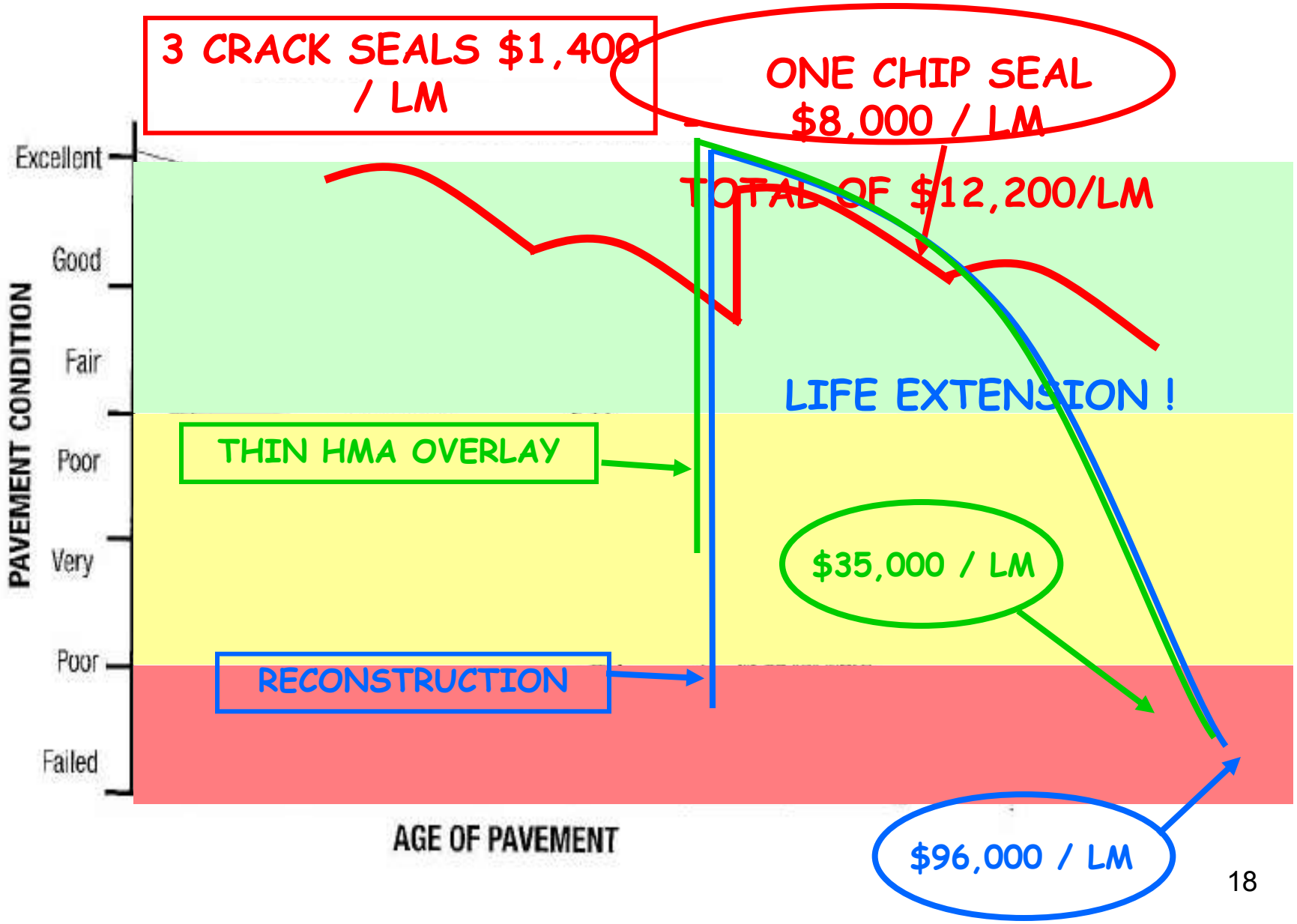
With the Departments goal of treating 10% of our roads annually, we must take advantage many treatments so as to be achieve this with our budgets in an effort to maintain and possible improve our asset.

PAVEMENT PRESERVATION MAKES GOOD CENTS

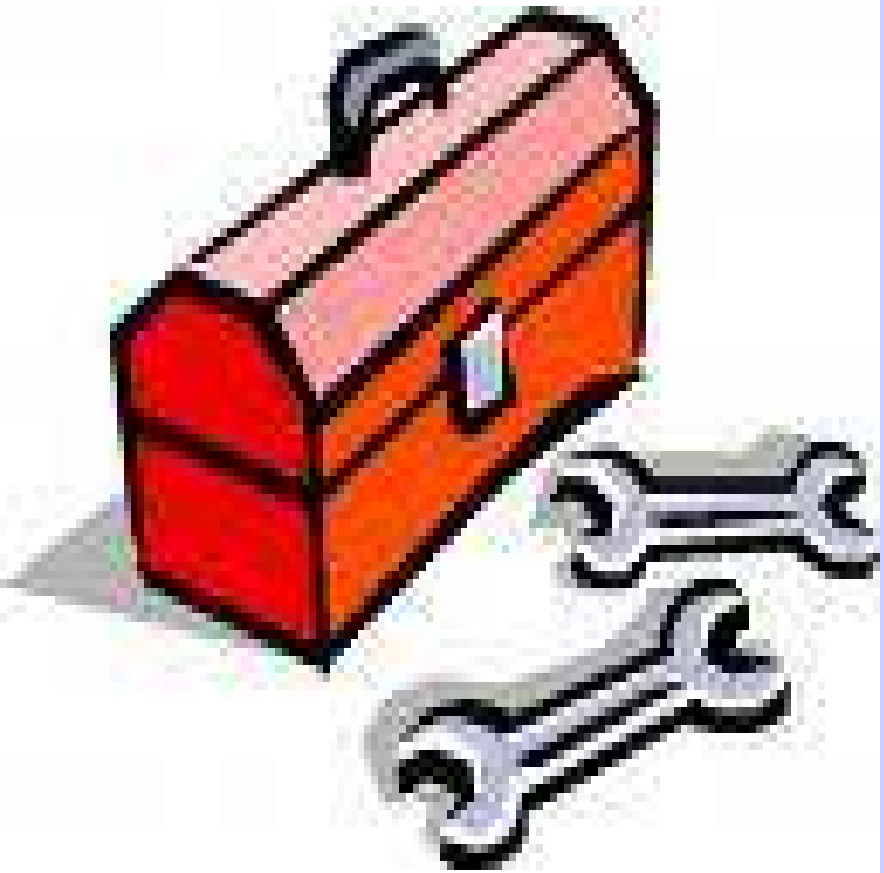
THE GOAL OF THE NCDOT IS TO TREAT AT LEAST 10% OF OUR ROADS ANNUALLY !

	Exp. LIFE/Yr	COST/LM	COST/ YR/LM
CRACK SEAL (3-5)	4	$1,400	$350
CHIP SEAL (8-10)	8	$8,000	$1,000
MICROSURFACING(6-10)	8	$14,665	$1,833
THIN OVERLAY(8-12)	10	$35,000	$3,500
MILL & FILL (8-12)	10	$96,000	$9,600

PAVEMENT PRESERVATION



What Treatments or Tools are in Our Tool Box



We contract out all of these treatments, as well as self-perform crack sealing and chip seals. Possible work for you to consider performing. !!!!!!!

Crack Filling

Chip Seal

Slurry Seal

Cape Seal

Microsurfacing

Thin Lift HMA overlay (less than 1”)

Surface Abrading and/or
Pavement Texturing

Fog Seal and Rejuvenator Seal

CRACK FILLING

The best early preventive technique to prolong the life of our roads.

THE MOST COST EFFECTIVE TREATMENT WE USE !

Addresses:

Transverse(Block) Cracks

Reflective Cracks

Longitudinal Cracks

Early Cracking in Wheel Path

Cost Effective: 4 - 6 times cheaper than chip seals and slurry seals

CHIP SEALS

Seals minor cracks

Retards Water Infiltration

Restores Friction

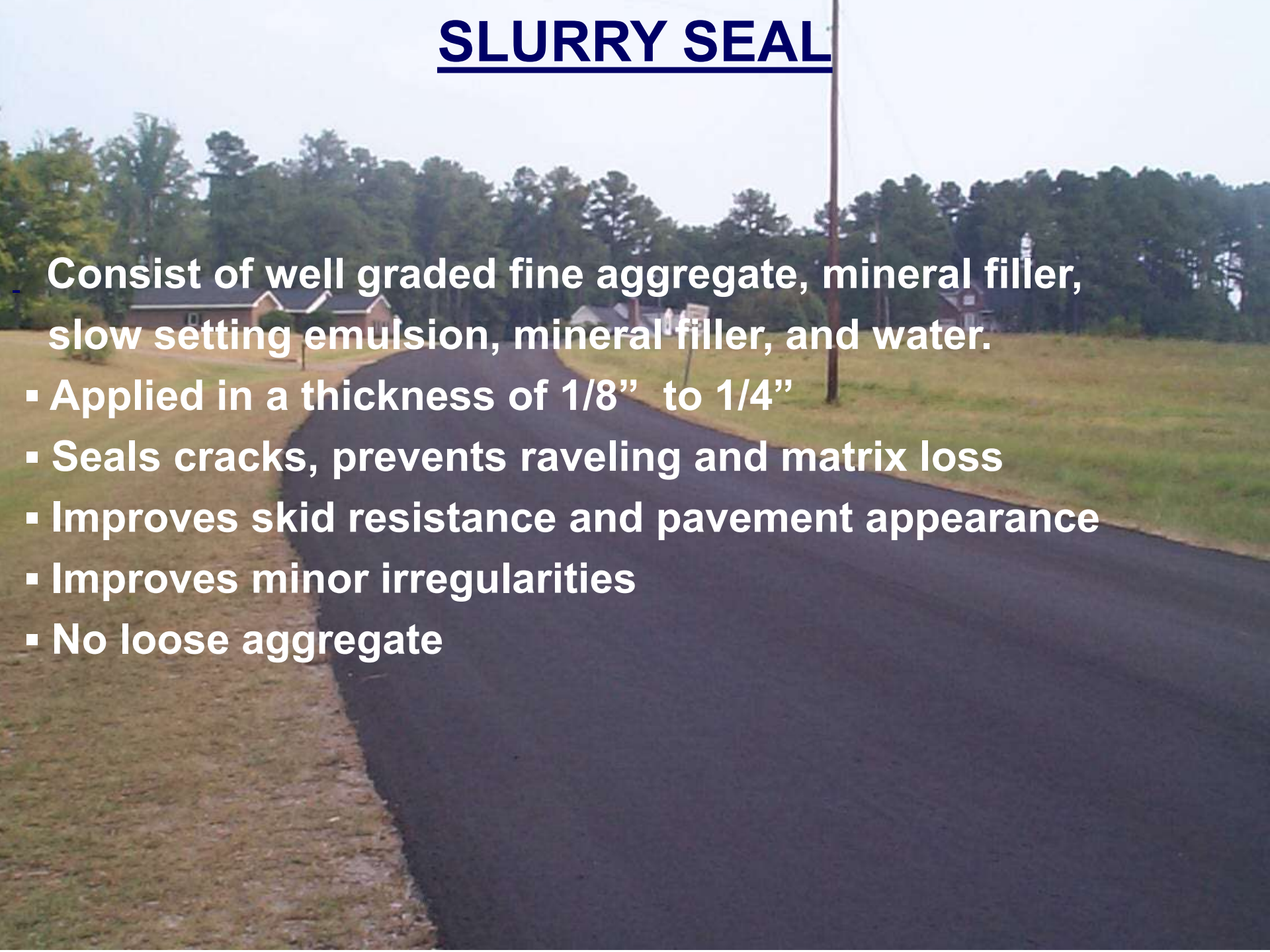
Retards Raveling

Increases the time before cracks reappear

Application (s) of asphalt emulsion and a thin layer of aggregate uses to correct raveling, address friction issues, polishing and bleeding.

SECOND MOST COST EFFECTIVE PAVEMENT PRESERVATION TREATMENT UTILIZED !

SLURRY SEAL



- Consist of well graded fine aggregate, mineral filler, slow setting emulsion, mineral filler, and water.
- Applied in a thickness of 1/8” to 1/4”
- Seals cracks, prevents raveling and matrix loss
- Improves skid resistance and pavement appearance
- Improves minor irregularities
- No loose aggregate

Cape Seal

Consist of a chip seal overlaid with a Slurry Seal.

MICROSURFACING

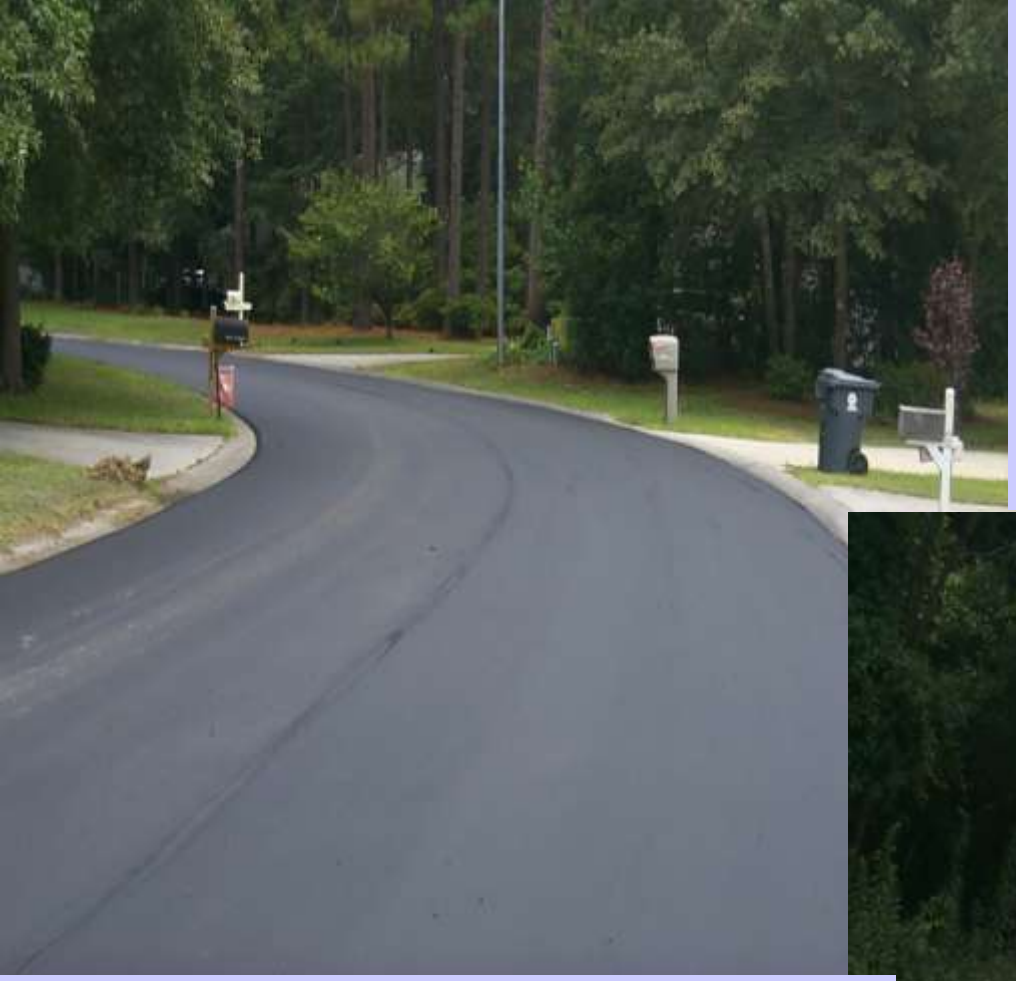
A mixture of high quality aggregates, polymer modified emulsion, mineral filler and water.

Inhibits raveling and surface oxidation

Improves surface friction and appearance

Fills ruts & minor irregularities by using two courses

THIN HMA OVERLAYS with S-4.75A & SA-1



- Corrects minor deficiencies smoothness, raveling, & oxidation
- Improves appearance, fills minor ruts and irregularities
- Adds some structural value

SURFACE ABRADING or PAVEMENT RE-TEXTURING

- Restores friction and skid resistance
- Increases Macro-texture
- Improves crash experience
- Extends pavement life

SURFACE ABRADING WITH REJUVENATION

- Creates a mechanism for applying pavement rejuvenators to higher volume roadways
- Increases pavement skid or friction numbers, reducing short term impact of rejuvenator
- Increases pavement macro-texture, enhancing penetration of rejuvenator
- Low cost treatment with a potentially high ROI for HMA pavements

Fog Seal

Description

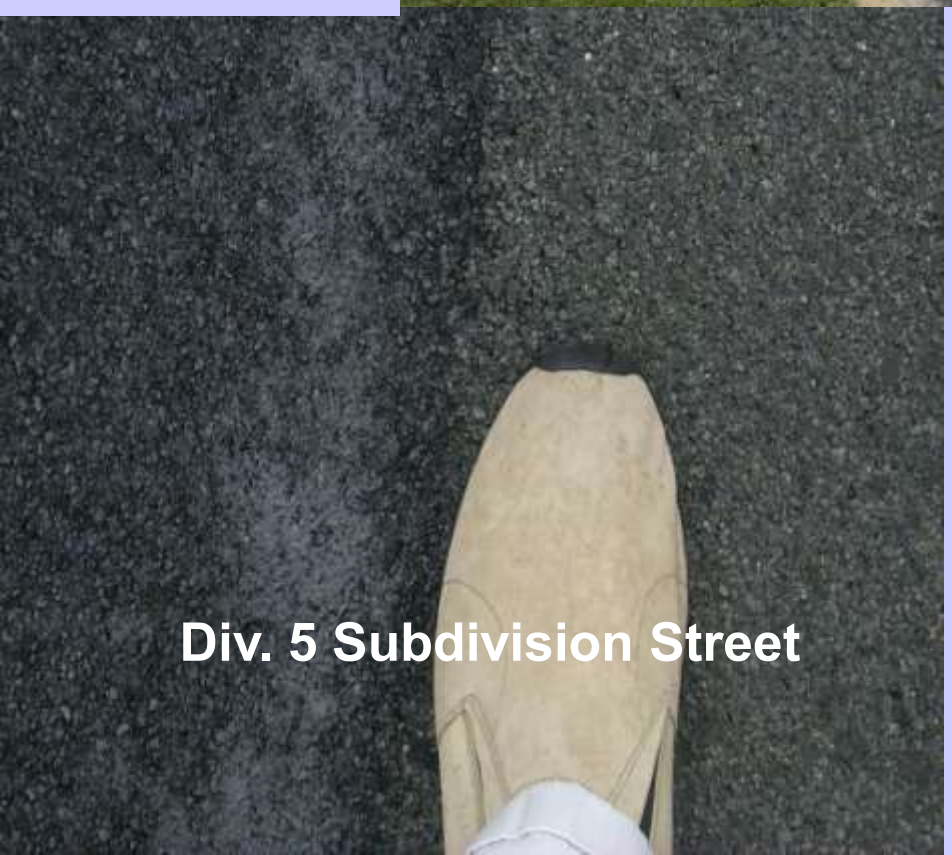
Light application of diluted, slow-setting asphalt emulsion without aggregate cover

Purpose

- Seal pavement surface, improving waterproofing by filling surface voids
- Aids in aggregate retention
- Retards Oxidation by providing barrier to UV rays
- Reduces further loss of maltenes from AC

FOG SEALS

Div. 9 Pilot Mtn. Overlook



Div. 5 Subdivision Street

Div. 9 Secondary Road

Rejuvenator Seal

- Emulsion of specific petroleum oils and resins
- Seals and penetrates asphalt
- Restores flexibility and cohesive ability of asphalt, preventing raveling
- Restores maltene fractions in the AC binder
- Ideally used on pavements 3 to 5 years old
- Service life: 5 – 7 years
- Restriping is not necessary
- Should be used on lower speed rural roads

  (less than 40 mph or in conjunction with Surface Texturing)
- Curing Time: 30 – 60 minutes

Pavement Preservation for Concrete Pavements

- Joint and Crack Sealing
- Diamond Grinding
- Dowel Bar Retrofit and/or Load Transfer Restoration
- Partial Depth Repair
- Full Depth Repair
- Microsurfacing
- Ultra Thin Bonded Wearing Surfaces

Bridge Preservation Program

In 2009 NC began a Bridge Preservation Program with a Statewide Bridge Preservation Engineer in the Bridge Management Unit

Pavement Preservation