



RIDOT

Rhode Island - State of Pavement Preservation

NEPPP 2011
Boston, MA

PROGRAM OUTLINE

1) Program History

- 1998 - \$460k, 4 state funded crack seal projects
- 2011 - \$6.2 mil, 6-crack seal, 2-Chip seals, 2-1” thin overlays

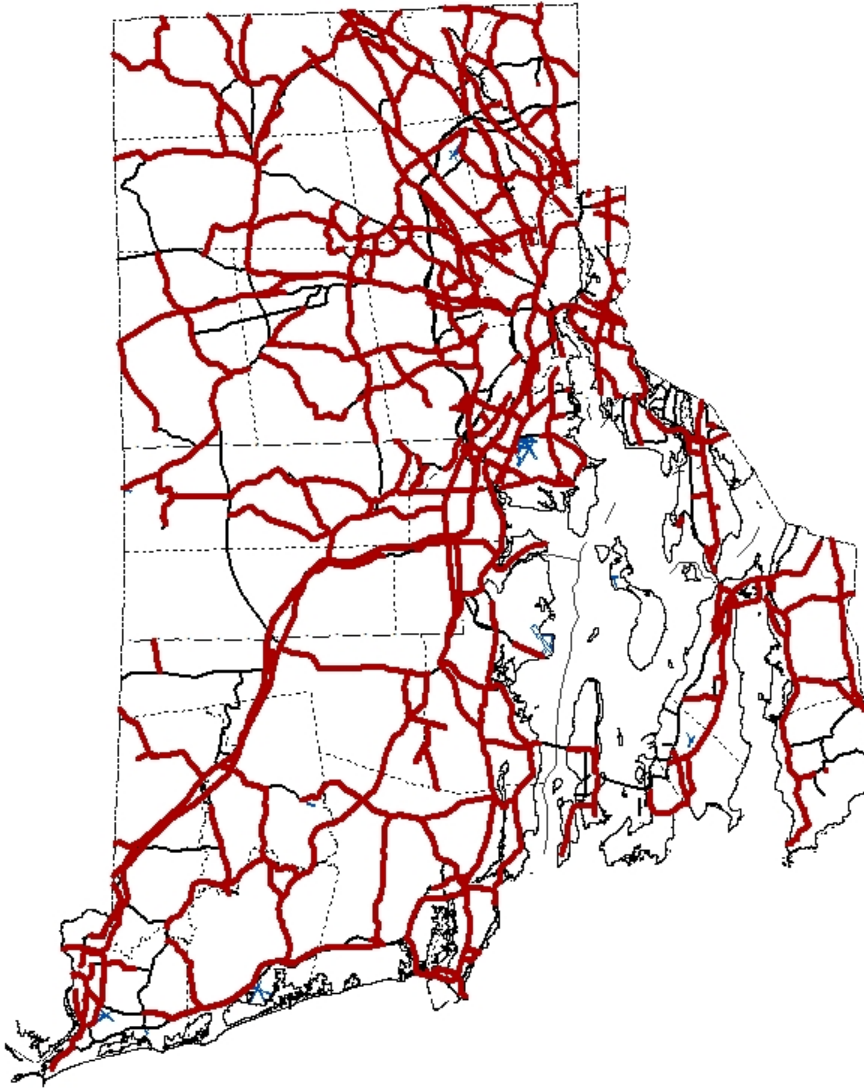
2) Pavement Preservation Tools/Treatments

- a) Crack Seal
- b) Microsurfacing
- c) 20% Rubber Asphalt Chip Seal (RACS)
- d) Double Latex Emulsion Chip Seal
- e) Nova Chip
- f) Polymer/Crumb Rubber Modified Asphalt Thin Overlay
- g) Stress Absorbing Membrane Interlayer (SAMI)
- h) Reclamation

RIDOT Crack Seal Program 1998-2011



CRACK SEAL 1998-2011



*1998-2011
Crack Seal*

1700 Lane
Miles
27 Million
Linear Feet

Crack Seal Material Composition

- **ASTM D 6690 Type II**
- **Chemically Modified Crumb Rubber Asphalt**

Neat Asphalt – PG 58 – XX

Crumb Rubber – Minimum 5%, 80 mesh

Chemical Bonding Agent

Blended AC – PG 70-28

Blend Viscosity – 3 Pa · s @ 300°F

Fibers – 10 mm length polyester, 15 dpf

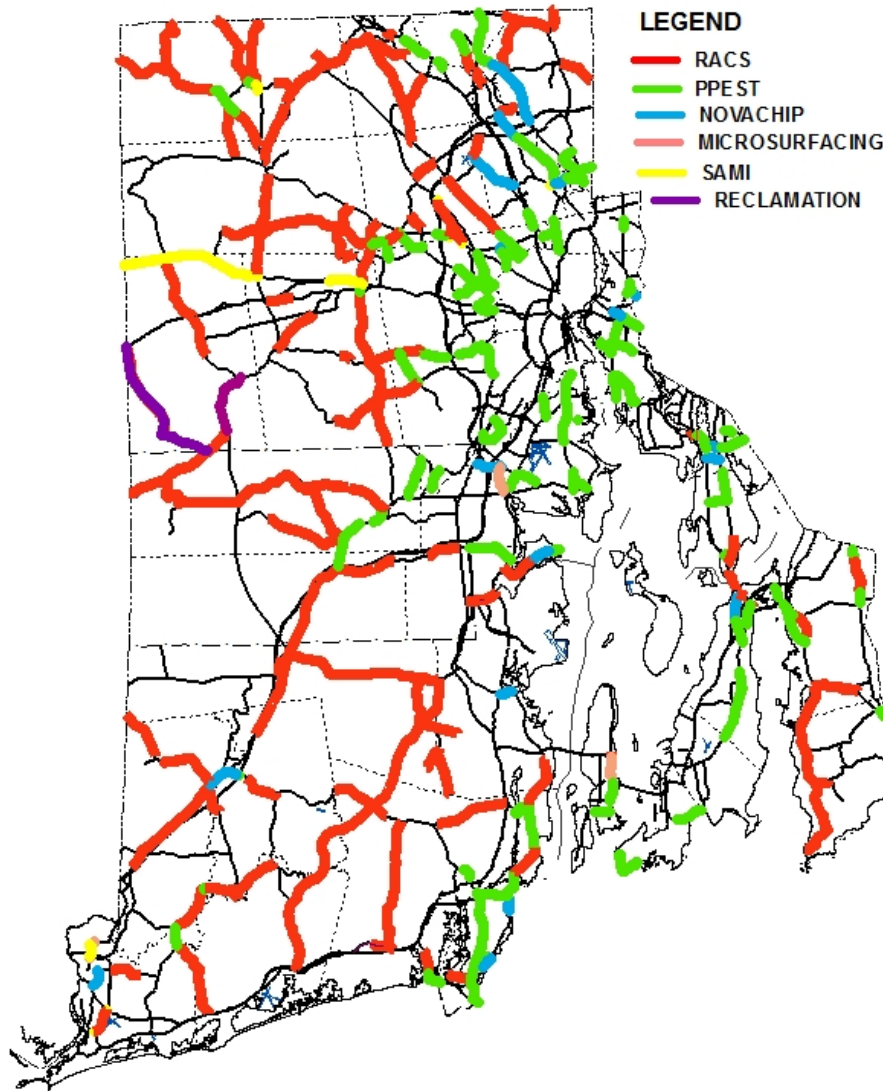
Crack Sealing Issues



Block Sealer ASTM D-6690

RIDOT Surface Seal Program 1999-2011

SURFACE SEALS 1999-2011



1999-2011 Surface Seals

624 Lane Miles

Microsurfacing 1999-2000



Pavement Preservation Program



- **MICROSURFACING** - A polymer modified asphalt slurry consisting of emulsion, aggregate and Portland cement.

Microsurfacing Projects



1999 - Block Island

- No hot mix asphalt plants
- 16 lane miles
- 113,000 yd²

Microsurfacing Projects



2000 - Mainland

- 28 lane miles
- 197,000 yd²

Microsurfacing Issues



- Cracking
- Delamination

Microsurfacing Issues *— Delam*



CHIP SEALS



- 20% Rubber Asphalt Chip Seals (RACS)
- Double - Latex Modified Emulsion Chip Seal

20% Rubber Asphalt Chip Seal (RACS)



20% Rubber Asphalt Chip Seal (RACS) — Definition/Properties

RACS is a blend of 20% crumb rubber and asphalt, spray-applied at the rate of 0.6 gallons per square yard and covered with 3/8" or 1/2" precoated stone

20% Rubber Asphalt Chip Seal Material Composition

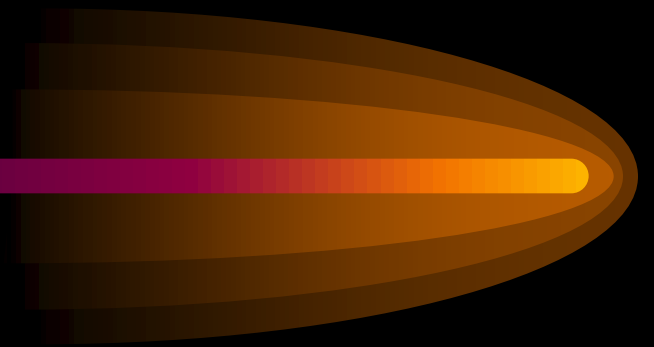
- PG 58 – 28
- Crumb Rubber – Max size #10 sieve
- Rubber % - 20 ± 3
- Aggregate Size – 3/8” to 1/2” (single size)
- 100% Aggregate coating w/PG 58 - 22

20% RACS Projects

1999 - 2011

- 549 Lane Miles

- 3,900,000 yd²



Asphalt Rubber Chip Seal Issues — Stone Kick Out



Asphalt Rubber Chip Seal Issues — Flushing



Paver Placed Surface Treatment (Nova Chip) 2000-2001



Paver-Placed Surface Treatment (Nova Chip/PPST) - Definition

PPST is a polymer emulsion (applied at 0.25 gallons per square yard) sprayed immediately before placement of the hot mix overlay (5/8").

Paver-Placed Surface Treatment (Nova Chip/PPST)



2000 - 2001

- 40 Lane Miles

- 282,000 yd²

Paver-Placed Surface Treatment (Nova Chip/PPST) - Issues



Paver-Placed Elastomeric Surface Treatment – 1" Thin Overlay (PPEST)



Paver-Placed Elastomeric Surface Treatment — Definition



PPEST is a mixture of coarse-graded 1/2 inch crushed aggregate and a modified asphalt binder.

- Produced in a conventional hot mix plant
- Applied to a tack-coated surface (.08 gal/yd²)
- Placed to a one-inch compacted thickness

Paver-Placed Elastomeric Surface Treatment



PPEST: Paver Placed Elastomeric Surface Treatment (1" Overlay)

- 2001-2008: Chemically modified crumb rubber asphalt (CMCRA 7% rubber); 91 lane miles ~640,100 yd²
- 2008 – 2010: Polymer Modified Asphalt (SBS); 17.3 lane miles ~ 120,000 yd²
- 2010 – 2011: Crumb Rubber Modified Asphalt; 22 lane miles ~ 155,000 yd²

CRMCA PPEST Composition

Binder: CMCR A

- Neat Asphalt: PG 58 – XX
- Crumb Rubber: 7% with Chemical Bonding Agent
- Asphalt Blend: PG 76 – 28

Separation < 5%

PAV < 5000 KPa @ 7 °C

El Rec ≥ 70% @ 4°C

Aggregate: Maximum size ½”

Marshall Mix Design: Stability 1000 lbs, Flow 8-16

POLYMER MODIFIED PPEST

Composition



Binder: SBS Polymer Modified

- Neat Asphalt: PG 58 – XX
- Meet AASHTO M 320 for PG 76-28
- Separation less than 5%
- Elastic Recovery $\geq 70\%$ @ 4°C

Asphalt Binder with Crumb Rubber- PPEST composition



Binder:

- Neat Asphalt: PG 58 – XX
- Meet AASHTO M 320 for PG 76-28
- Terminally Blended
- Crumb Rubber $\geq 15\%$ by weight max. size 40 mesh
- Elastic Recovery $\geq 70\%$ @ 4°C

2011 PPEST TEST SECTIONS



River Road, Lincoln, RI

- 1.2 miles long
- 6000 ADT, 5% trucks
- Three .4 mile test sections
 - Asphalt Binder with 17% crumb rubber
 - Polymer modified ((SBS) Asphalt
 - Asphalt Binder with 17% crumb rubber with warm asphalt te

Stress Absorbing Membrane Interlayer (SAMI)



Pavement Preservation

SAMI to Date

- **SAMI (Stress Absorbing Membrane Interlayer)**
 - **2000**
 - 2 RACS + Novachip (1 lane mile,
 - Cape Seal (.4 lane miles)
 - **2004**
 - RACS + PPEST (1.2 lane miles)
 - RACS + Hot mix (2.8 lane miles)
 - **2005** – RACS + PPEST (7.5 lanes miles)
 - **2009** – RACS + PPEST (15.5 lanes miles)
 - **2011**
 - RACS + PPEST (5.4 lane miles)
 - RACS + Polymer Modified Asphalt

Full Depth Reclamation (FDR) 2005-2011

FDR Projects



2008 - 2009

Three FDR with Calcium Chloride

2010

Two FDR with latex modified emulsion

2012

One FDR with portland cement and emulsion

RIDOT Pavement Preservation Monitoring Program

2000 - 2007

Distresses/Measurements Monitored

- Joint Opening (Linear feet)
- Longitudinal Cracking (Linear feet)
- Transverse Cracking (Linear feet)
- Edge Cracking (Linear feet)
- Alligator Cracking (Area)
- Block Cracking (Area)
- Reflection Cracking from rigid base (Linear feet)
- Potholes (Number and Area)
- Utility Patches (Number and Area)
- Rutting
- Shoving
- Raveling (Area)
- Bleeding (Area)
- Polished Aggregate (Area)
- Skid Data
- IRI (mm/m)

Monitoring – Performed by the Pavement Management Engineer and assisted by an R&T Technician.

- 2 sections of 100' of roadway were chosen randomly [for each treatment], with each lane representing a monitoring segment within each section.
- Distress assessments were conducted per the LTPP Distress Manual, with some modifications.
- Fall and spring were chosen as the times to inspect each section.
- Photographic records are also maintained.

Section Crack Map 2003

MONITORING TYPE -

YEAR PLACED - 2000

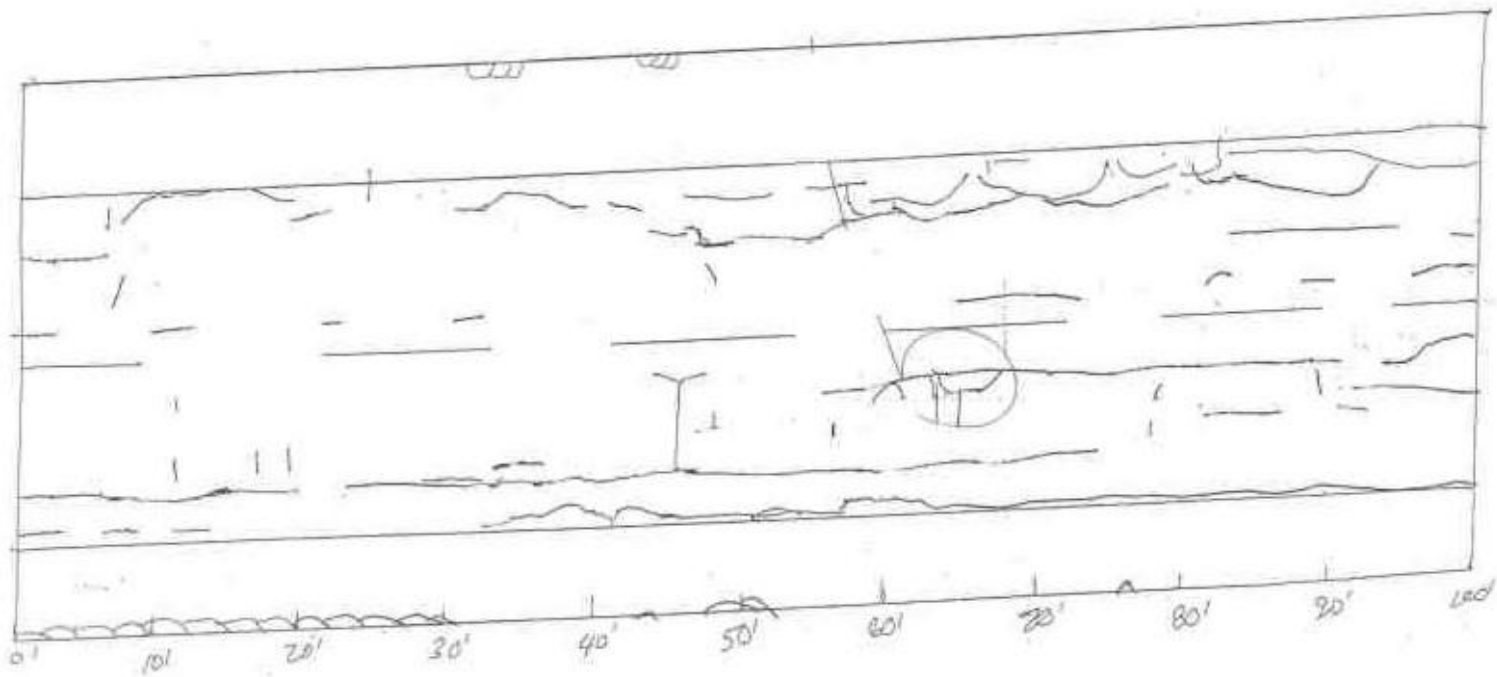
ROAD -

LIMITS -

TOWN - JAMESTOWN

REVIEW DATE - FALL 2003

SECTION ID -





FUTURE

- Hot in place recycling
- Cold in place recycling
- Fog Seals

Questions

