

Pavement Patching Repair for AC and PCC Pavement Surfaces

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Overview and Objective

“New” Methods For Pavement Patching-Overview

- What are they
- How they are applied

New Methods

Secti

on

Spray Injection

II. Polymer modified asphalt based binder/aggregate mixtures (AC pavement repair)

III. Polymer modified resin based binder/aggregate mixtures (PCC pavement repair)

IV. Joint Adhesive

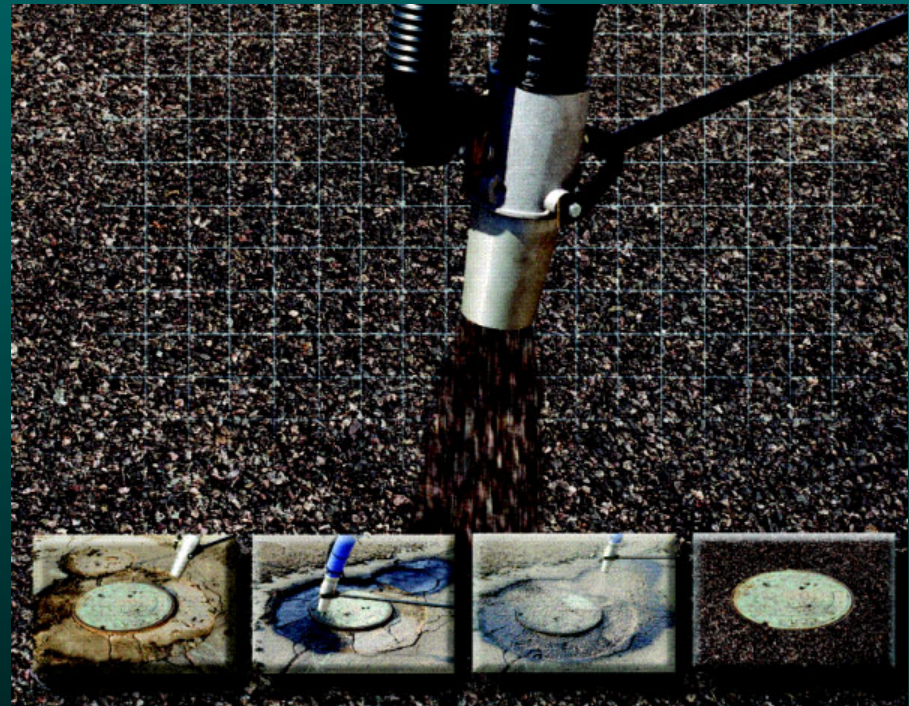
Section #I

Spray Injection



Spray Injection

“THE COMBINATION
OF 2 COMMON
MATERIALS:
CRUSHED
AGGREGATE &
WATER BASED
EMULSION THROUGH
A SINGLE PIECE OF
SELF-CONTAINED
EQUIPMENT”.



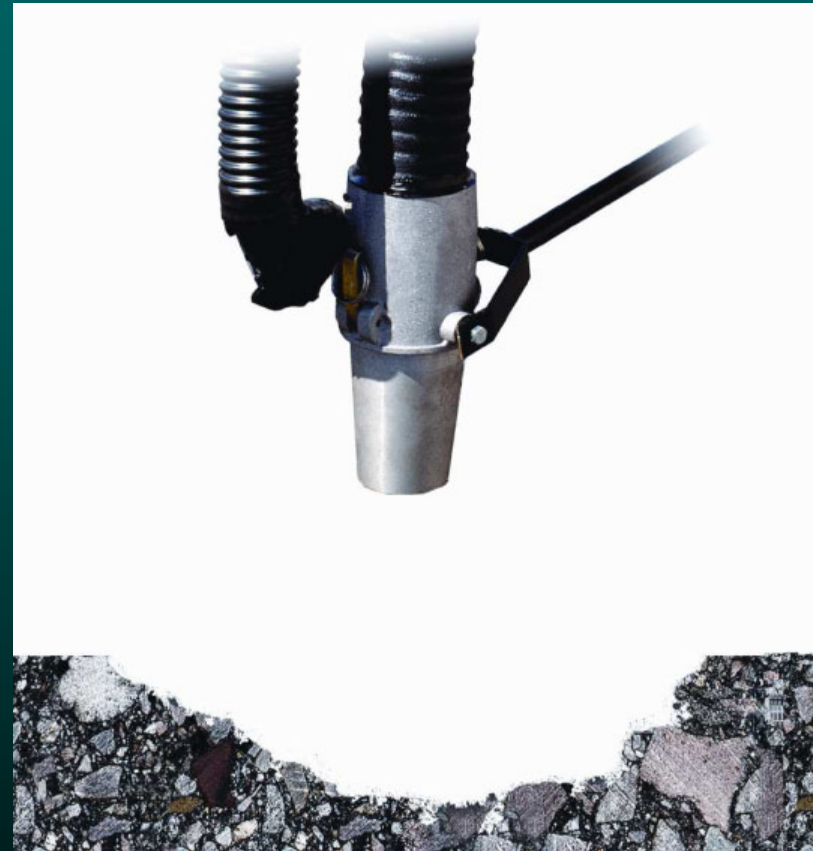
Spray Injection

Application:

- Blow out Debris
- Apply tack material
- Fill and compact material

Step 1 - Blow

- High Velocity Air Removes
 - Dirt
 - Loose Pavement
 - Water

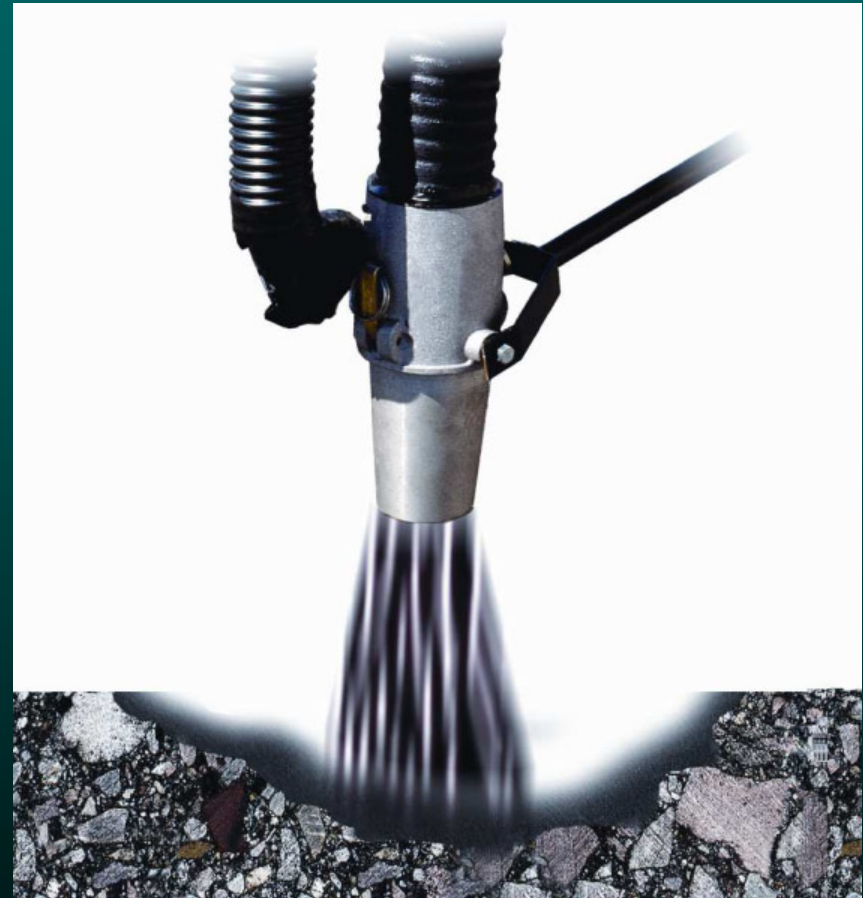


Blow



Step 2 - Tack

- Emulsion Application
- Increase Bond to Repair Area

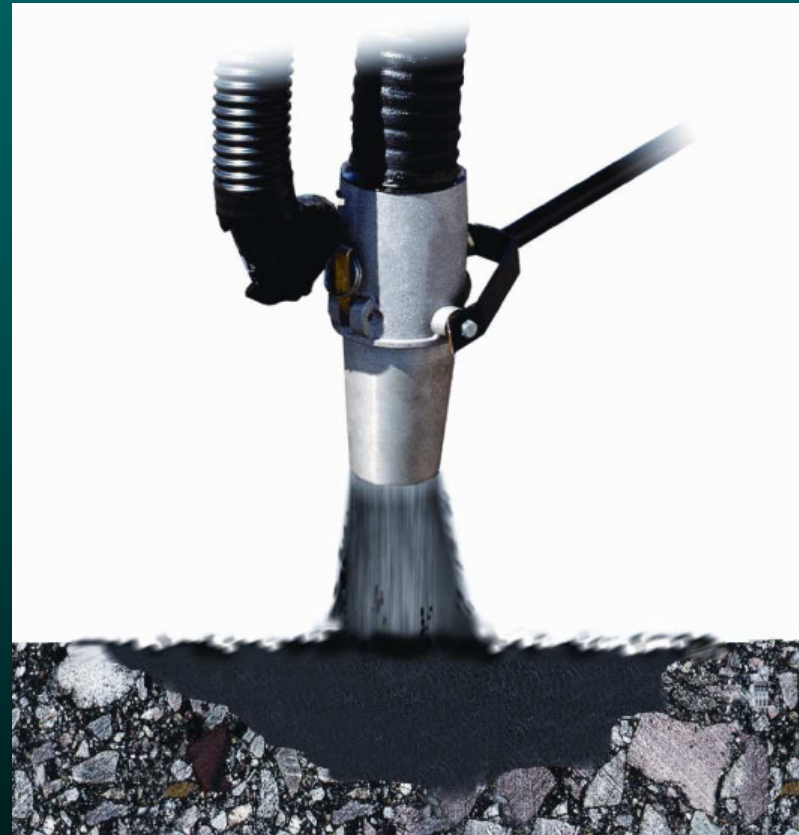


Tack



Step 2 – Fill and Compact

- Emulsion coats the stone
- Filling from the bottom up
- You control the material



Fill and Compact



Pothole



Manhole



Medium-High Severity Alligator Cracking



Application



Benefits of Spray-Injection

- Year-round use-- with emulsion availability
- No mechanical compaction required, rolling optional
- Use local materials
- Up to 7 tons per hour application
- Less than one minute to repair pavement for traffic
- Can be used in cool, damp conditions-- forgiving process to workmanship and environmental conditions

Section #II

Polymer modified asphalt based
binder/aggregate mixtures

**Patch repair for AC
pavements = PolyPatch
and Mastic One**

Application:

- Hot-applied
- Pourable
- Self-adhering
- Self-leveling

Polymer modified asphalt based binder/aggregate mixtures

Uses

- Large thermal ($>1.5''$ wide) cracks/joints
- Recessed transverse cracks
- Moderately Fatigued (alligator) areas
- Wheel ruts
- Bridge approaches
- Manhole covers
- Curb line

Wide Thermal Crack



PolyPatch/Mastic One Application Thermal Crack



Longitudinal Cold Joints - before



Longitudinal Cold Joints - after



Bridge Approaches



Manhole



Curb Line



Wheel Ruts



Wheel Ruts



Alligator Cracks - before



Alligator Cracks - after



Review

Benefits of Polymer modified asphalt based binder/aggregate mixtures

Patch Repair for AC Pavements

- Year-round use
- Cost effective
- Permanent repair
- Flexible
- Prevents moisture penetration
- Versatile applications
- Load bearing

Section **Polymer modified resin based** **binder/aggregate mixtures**

Patch Repair for PCC **Pavements =** **Application **TechnoCrete****

- Hot-applied
- Pourable
- Self-adhering
- Self-leveling
- About one (1) hour setup

Polymer modified resin based binder/aggregate mixtures

TechCrete Uses

- Thin Bond Repairs
- Failure on Slabs on Single & Multi Corners
- Spall Areas
- Wide Cracks and/or Joints
- Manhole & Drainage Areas
- Bridge Approaches - PCC to AC

Polymer modified resin based binder/aggregate mixtures

TechCrete Preparation

- Saw cut borders
- Chip out old material
- Blow out debris
- Dry out moisture with heat lance

Before / Need for Repair



Preparation



Preparation



Preparation



Polymer modified resin based binder/aggregate mixtures

Installation

- Prime area
- Hot applied in layers (2” lifts max)
- Self levelling.
- Dressed in high PSV(polished stone value)
Aggregates.

Installation



Installation



Installation



Installation



Installation Complete



Installation



Wide Random Cracks





Review

Benefits of Polymer modified resin based binder/aggregate mixtures

- Long lasting
- High tensile strength
- Spans joints
- Multi corner slab repairs
- **Flexible**
- Compressive resistant
- Excellent adhesion
- Open to traffic in about on hour

Section #IV

Use Of Joint Adhesive To
Reduce Longitudinal Paving
Joint Crack Formation And
Deterioration

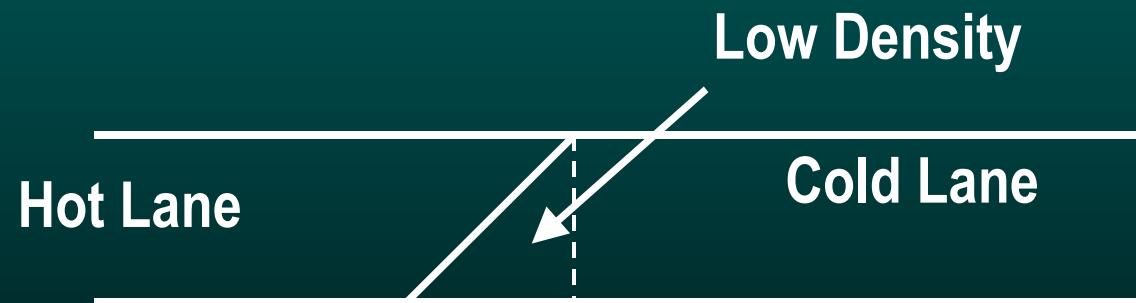
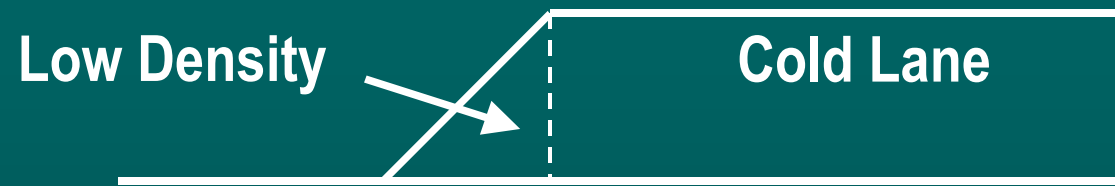


Deteriorated Paving Joint

- Early in pavement life
- Raveling
- Accelerating deterioration
- Requires maintenance
- Shortened pavement life



- Joint deterioration problem**
- Joint adhesive technique**
- Materials**
- Installation**
- Performance studies**
- Usage and acceptance**
- Costs**





Low Density Zone

- Higher permeability, weaker area
- Increased oxidation/raveling
- Moisture freeze/thaw spalling
- Crack formation, spalling, widening
- Early deterioration
- Significant problem

Joint Adhesive technique

- Application of specialized materials to the cold joint surface
- Seals and protects the low density area
- Adheres and flexiblizes the joint







Adhesive Materials

**-Hot-applied, highly polymer modified
asphalts with improved high temperature
stiffness, sag resistance, adhesion and low
temperature performance**

Installation

- Oil jacketed, hot applied melters
- Spray or squeegee apply to entire surface
- Approx. 1/8" thick band.
- Approx. 1/2" overlap on top, up to 2" on bottom
- Apply ahead of paver
- Keep traffic off of, repair any damaged areas
- Place and compact adjacent mat

Performance studies

-NCAT, Longitudinal Joint Construction Techniques For AC Pavements

-Michigan, Wisconsin, New Jersey, Colorado, Pennsylvania Research Projects

Techniques studied

-12/1 wedge

-Hot side rolling

-3/1 wedge

-Cold side rolling

-Cutting wheel

-Edge resistant

-Joint maker

-Joint adhesive

Colorado – 5 years

-Joint Adhesive – **BEST**

16% cracking (1/8 – 1/4 in.)

8.7 rating

-Cutting wheel – Next best

44% cracking (1/8 – 1/4 in.)

7.7 rating

-Taper, hot side rolling – **WORST**

88% cracking (1/2 – 1 in.)

2.3 rating

Without Joint Adhesive



With Joint Adhesive



Acceptance for Usage:

-Ohio Turnpike

-Michigan

-New Jersey

-Minnesota

-Indiana

-Warranty Projects

Benefits of Longitudinal Joint Adhesive

- Significantly improved joint life
- Improved pavement life
- Delays future maintenance and related traffic delays and safety issues
- Proven, consistent process

Summary

- Paving joints deteriorate due to degradation of the low density wedge**
- Joint Adhesive seals, adheres, and flexibilizes the joint area**
- Improves joint performance, best technique**
- Delays future maintenance**
- Proven, dependable, available process**

Summary-New Patch Methods

- I. Spray Injection
- II. Polymer modified asphalt based binder/aggregate mixtures for AC pavements (PolyPatch/Mastic One)
- III. Polymer modified concrete based binder/aggregate mixtures for PCC pavements (TechCrete)
- IV. Longitudinal paving joint control

Questions?