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

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New Methods

Section

I. 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

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Section #I

Spray Injection

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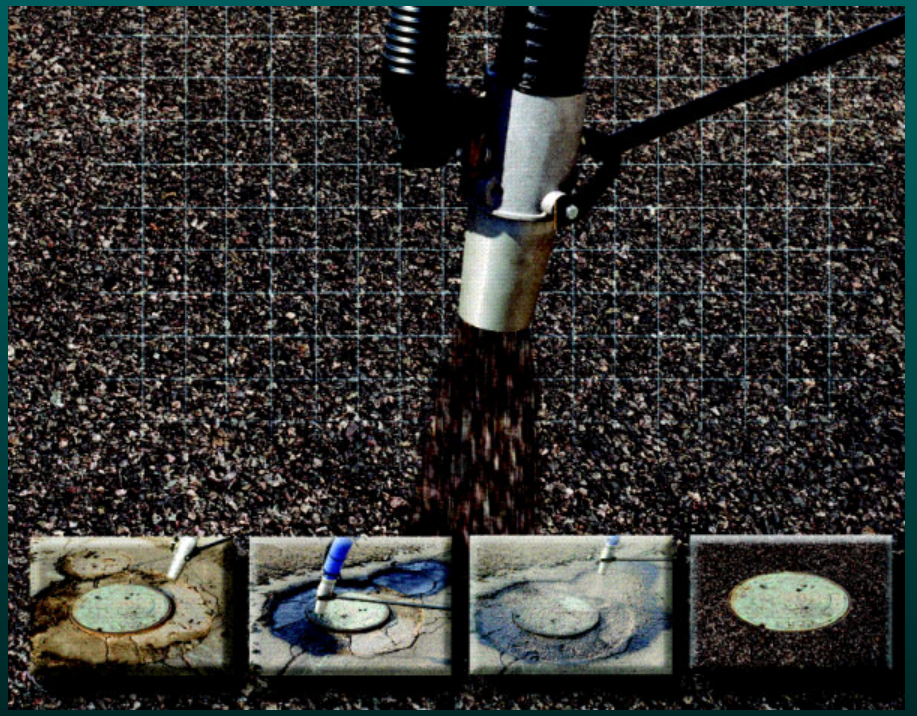
Spray Injection

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



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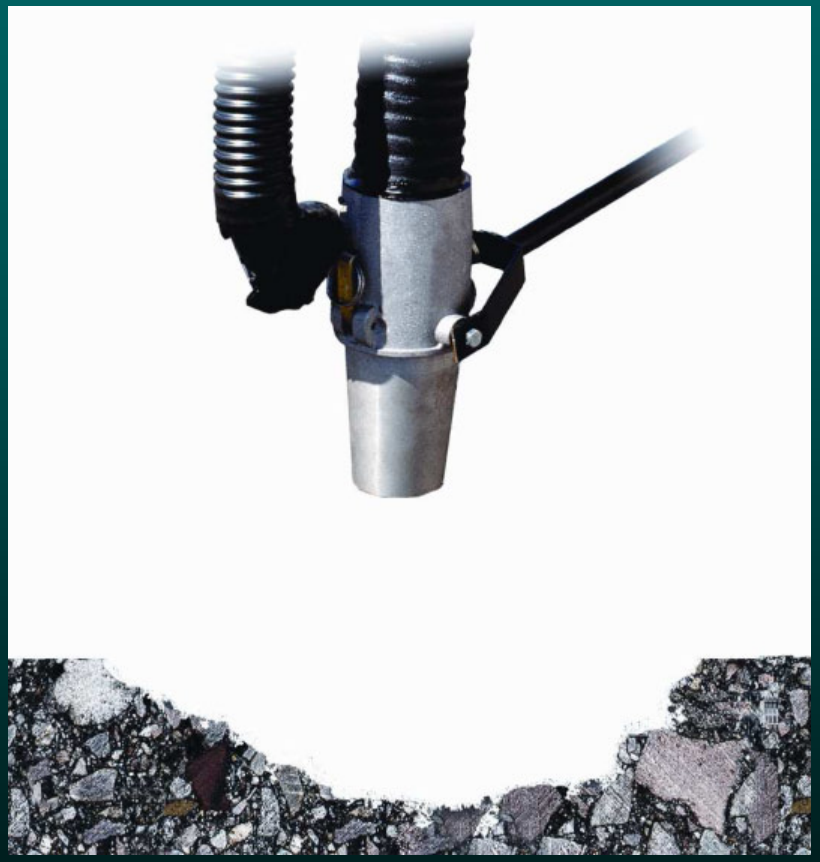
Spray Injection

Application:

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

Step 1 - Blow

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



Blow

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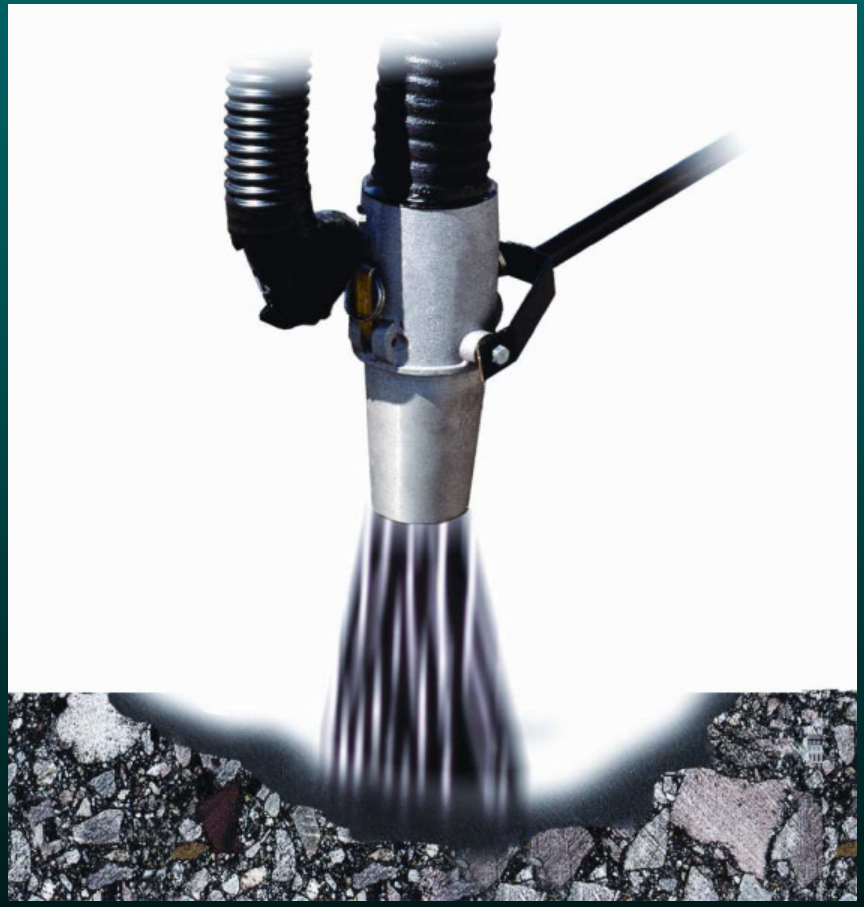
Step 2 - Tack

- Emulsion Application
- Increase Bond to Repair Area



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Tack

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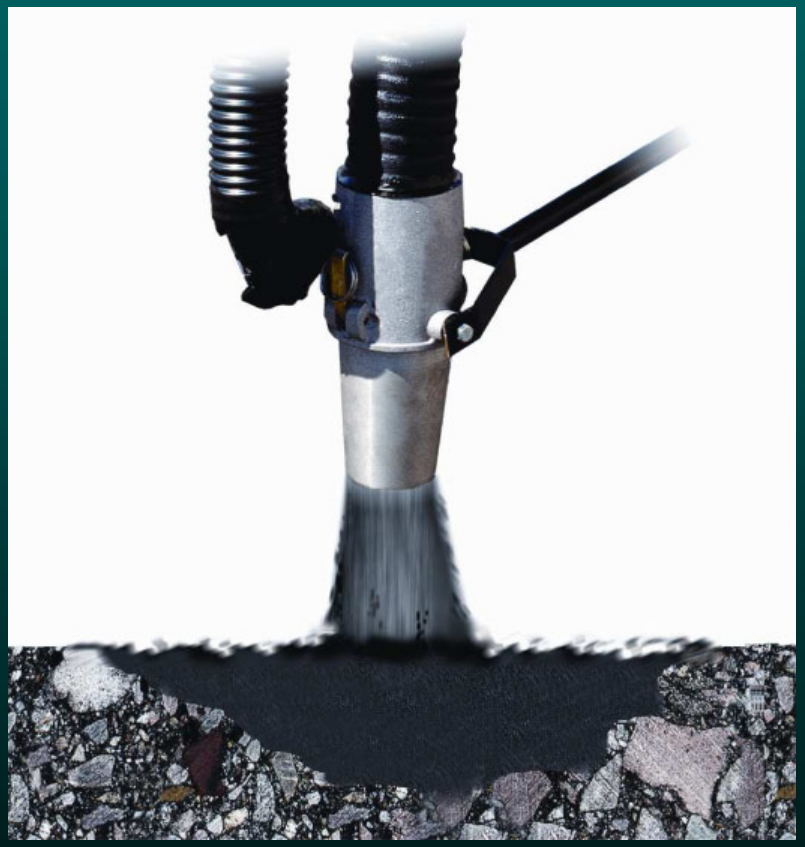
Step 2 – Fill and Compact

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



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Fill and Compact

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Pothole

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Manhole

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Medium-High Severity Alligator Cracking

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Application

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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

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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

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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

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Wide Thermal Crack

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PolyPatch/Mastic One Application Thermal Crack

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Longitudinal Cold Joints - before

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Longitudinal Cold Joints - after

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Bridge Approaches

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Manhole

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Curb Line

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Wheel Ruts

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Wheel Ruts

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Alligator Cracks - before

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Alligator Cracks - after

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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

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Section

Polymer modified resin based binder/aggregate mixtures

Patch Repair for PCC Pavements = PatchCrete

Application:

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

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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

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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

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Before / Need for Repair

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Preparation

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Preparation

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Preparation

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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.

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Installation

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Installation

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Installation

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Installation

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Installation Complete

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Installation

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Wide Random Cracks

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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

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Section #IV

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

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Deteriorated Paving Joint

-Early in pavement life

-Raveling

-Accelerating deterioration

-Requires maintenance

-Shortened pavement life

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-Joint deterioration problem

-Joint adhesive technique

-Materials

-Installation

-Performance studies

-Usage and acceptance

-Costs

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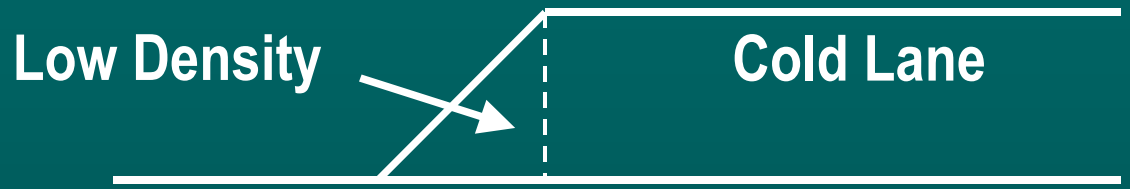

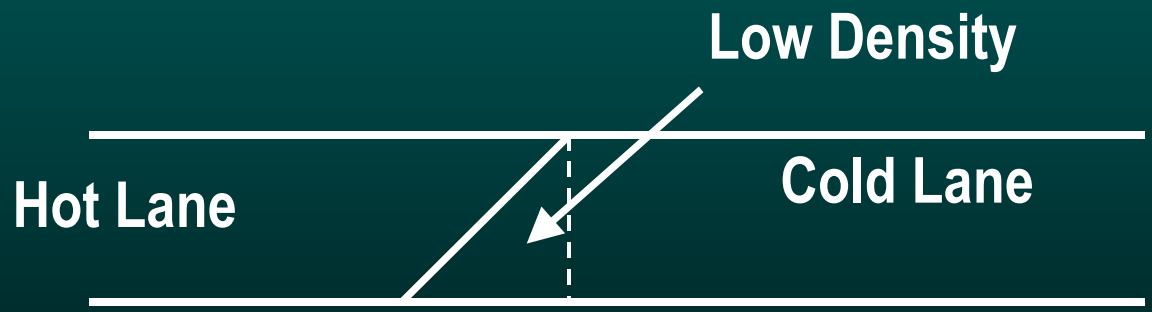

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Low Density Zone

-Higher permeability, weaker area

-Increased oxidation/raveling

-Moisture freeze/thaw spalling

-Crack formation, spalling, widening

-Early deterioration

-Significant problem

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Joint Adhesive technique

-Application of specialized materials to the cold joint surface

-Seals and protects the low density area

-Adheres and flexiblizes the joint

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Adhesive Materials

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

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Installation

-Oil jacketed, hot applied melters

-Spray or squeegee apply to entire surface

-Approx. 1/8” thick band.

-Approx. ½” 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

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Performance studies

-NCAT, Longitudinal Joint Construction Techniques For AC Pavements

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

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Techniques studied

-12/1 wedge

-3/1 wedge

-Cutting wheel

-Joint maker

-Hot side rolling

-Cold side rolling

-Edge resistant

-Joint adhesive

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Colorado – 5 years

-Joint Adhesive – **BEST**

16% cracking (1/8 –1/4 in.)

8.7 rating

-Cutting wheel – Next best

44% cracking (1/8 – ¼ in.)

7.7 rating

-Taper, hot side rolling – WORST

88% cracking (1/2 – 1 in.)

2.3 rating

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Without Joint Adhesive

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With Joint Adhesive

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Acceptance for Usage:

-Ohio Turnpike

-Michigan

-New Jersey

-Minnesota

-Indiana

-Warranty Projects

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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

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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

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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

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Questions?

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