

Environmental Solutions, Inc. CERATECH, INC. Technology Overview



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Overview

- Broad application for multiple industries
- Technology development undertaken in 1995
- 1st Rapid Repair "Proof of Concept" completed in the Fall of 1999



Product Description

Pavement...

- Nontraditional cementitious material
- Chemically bonded composite
- Uses industrial by-products as "aggregate"
- Flexibility of use
- Non-hazardous



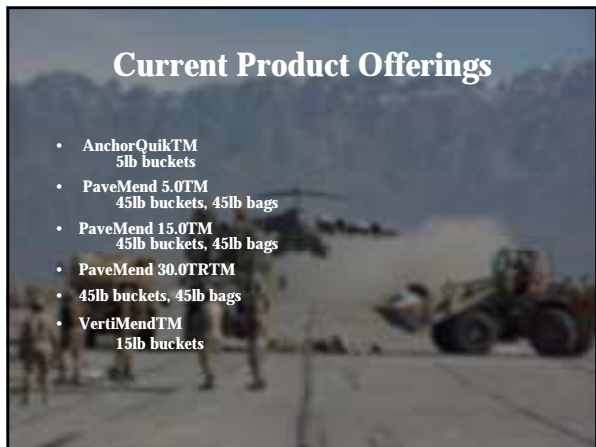
Product Performance Characteristics

- Zero shrinkage
- Freeze-thaw durability
- Slight expansion
- Sustained bond integrity
- 6000 psi at 28 days
- Weather/Temperature tolerant



Current Product Offerings

- AnchorQuik™
5lb buckets
- Pavemend 5.0™
45lb buckets, 45lb bags
- Pavemend 15.0™
45lb buckets, 45lb bags
- Pavemend 30.0™
45lb buckets, 45lb bags
- VertiMend™
15lb buckets



Applications

- Rapid Repair
 - airport infrastructure
 - roads and bridges
 - marine
 - rail
- Coatings
 - paint
 - overlayments
- Adhesive Concrete
 - grouts
 - anchor materials
- Precast
- Ready-mix



Product Benefits

- High early strengths
- Bonds to multiple materials
- Low modulus of elasticity (MOE)
- Very Low Coefficient of Thermal Expansion
- Non-Toxic
- Ease of use

Primary Applications

Structural surface repair: cracks, spalls, impact damage and other surface defects

<p><u>Horizontal Surfaces</u></p> <ul style="list-style-type: none"> • Bridge Decks • Parking Garages • Parking Lots/Curbing • Floors • Sidewalks • Joint Repair 	<p><u>Vertical Surfaces</u></p> <ul style="list-style-type: none"> • Bridge Decks (overhead) • Parking Garages (ceilings) • Floors (sloped) • Walls • Columns • Joint Repair
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Installation Procedures

Surface Preparation

- Users should follow ACI recommended practices to attain structurally sound conditions in preparation for repair, i.e.:
 - Generally sound mechanical surfaces that are clean and free of debris/residues;
 - Generally dry surfaces with no standing water;
 - Reinforcing steel should have no loose scale;
 - No bond coat is required
- Remove previously failed materials or repairs
- Protect during curing from impact and/or loads until desired strength or performance is achieved

Installation Procedures

Tools and Materials Required for Mixing

- Thermal gun
- Drill capable of 300 rpms minimum
 - torque sufficient to mix dry materials into solution
- Mixing paddle
 - quad blade type for Pavement materials
 - grout mixer blade type for VertiMend and AnchorQuik
- Water container (5 gallon bucket or similar)
- Water measuring container (1 gallon)
- Typical concrete finishing tools (trowel, broom, etc.)
- Saw cutting equipment (replacement of joints)
- Joint sealant material

Installation Procedures

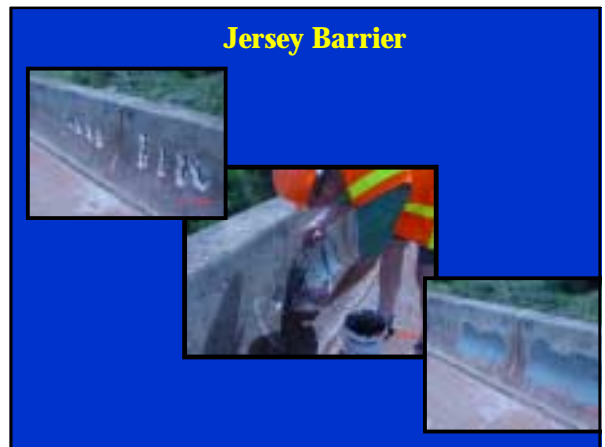
Repair Pitfalls

Placement over:

- Structurally damaged systems or design failures where the cause and repair solutions have NOT been determined
- Unsound existing repair materials or components
- Poorly prepared or contaminated surfaces such as grease, heavy oils, and petroleum-saturated surfaces
- Polymer based materials such as acrylic, latex coatings or paints, and silicone or rubber

State Departments of Transportation

<ul style="list-style-type: none"> • South Carolina - 12/02 • Florida - 03/03 • Rhode Island - 04/03 • Illinois - 05/03 • Connecticut - 05/03 • Virginia - 07/03 • Wyoming - 08/03 • Montana - 08/03 • Colorado - 08/03 • North Dakota - 08/03 • Hawaii - 09/03 	<ul style="list-style-type: none"> • Utah - 10/03 • Ohio - 11/03 • Pennsylvania - 11/03 • New York - 12/03 • Louisiana - 01/04 • Arizona - 03/04 • Texas - 04/04 • Georgia - 04/04 • North Carolina - 05/04 • Nevada - 07/04
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Installation & Handling Procedures

Working with Aggregate

- **PaveMend™** does not require the use of aggregate extenders
- Generally, other products require aggregate extenders due to excessive heat generation when those materials are used to depths of 1-2 inches or more
- **PaveMend™** can be poured onto an aggregate bed. It will penetrate 1-2 inches before solidifying

Installation & Handling Procedures

Working with Rebar

- All **PaveMend™** products exhibit exceptional bond strengths to steel
- This use extends to reinforcing bars (clean or oxidized)
- The bond with steel typically exceeds the modulus and design strength limits of the rebar

Installation & Handling Procedures

Post-Application Steps to Ensure Integrity of Repair

- All pavement/structural design conditions should be maintained or reestablished, to include control joints, sub grade stability, etc.

Current Product Offerings

- **AnchorQuik™**
5lb buckets
- **PaveMend 5.0™**
45lb buckets, 45lb bags
- **PaveMend 15.0™**
45lb buckets, 45lb bags
- **PaveMend 30.0™**
45lb buckets, 45lb bags
- **PaveMend 60.0™**
45lb buckets, 45lb bags
- **VertiMend™**
15lb buckets
- **PaveMend TR™**
45lb buckets, 45lb bags



TECHNICAL DATA

Product	Weight	Volume	Application
AnchorQuik™	5 lb	0.125 cu ft	Surface repair, patching
PaveMend 5.0™	45 lb	1.125 cu ft	Surface repair, patching
PaveMend 15.0™	45 lb	1.125 cu ft	Surface repair, patching
PaveMend 30.0™	45 lb	1.125 cu ft	Surface repair, patching
PaveMend 60.0™	45 lb	1.125 cu ft	Surface repair, patching
VertiMend™	15 lb	0.375 cu ft	Vertical repair, patching
PaveMend TR™	45 lb	1.125 cu ft	Surface repair, patching

CEMA