The Problem
Reflection Cracking & Moisture Damage

Before

Conventional HMA overlay
6 months later
The Problem

- Superpave didn’t address reflective cracking
- Many miles of PCC in poor condition
- Conventional HMA overlays not addressing need
- NCHRP recent Request for Proposal for reflective cracking addition to AASHTO Design Guide (1-41)
Core from a 3 Year Old Overlay Over PCC

(New Jersey Rt. 10)

Path for water intrusion to base

HMA Overlay cracked through to PCC joint
The Solution
Reflective Crack Relief System

Interlayer
- Thin (1”) fine aggregate HMA
- Highly elastic PMAC
- Asphalt-rich, impermeable

Overlay Recommendation
- SBS modified SHRP+ spec, 98% reliability
- Minimum thickness to protect interlayer based on traffic
The Solution
Reflective Crack Relief System

- Significantly delays reflective cracking
- Protects pavement from moisture damage (impermeable)
- Lengthens service life
- Recyclable
The Solution
Reflective Crack Relief System

Before

Control HMA overlay
Strata section

The crack stops here!

After
Performance Based Specification
Highly Crack Resistant

Cycles to Failure at 2000 microstrain

Interlayer Specification: 100,000
PG 76-28 HMA (PMAC): 6,000
PG 64-22 HMA: 2,000

AASHTO T-321, at test temperature
Test temperature determined by project climate
Strata Delays initial reflective cracking
- Over fabric & HMA overlays

Lengthens service life
- A projected 5 years or longer

Missouri US 36 Project

Percent
Reflective
Cracking

Strata System
Control


0% 20% 40% 60% 80% 100%
Strata provided an average 69% improvement in reflective cracking versus fabrics and HMA overlays.

Data represents 15 projects built with control sections, up to 5 years old.
The Solution
Impermeable Interlayer Protects Pavement Structure from Moisture Damage

Cracked overlay
Strata Interlayer intact

New Jersey Route 10, Constructed 1997
Strata Interlayer Protects Pavement

Core from US 62, Orange, TX, Constructed 1999

HMA Overlay - cracked

Strata Interlayer - not cracked

Old Pavement
Why Isn’t the Reflection Crack Over the Joint?

Stress distributed over larger area

Crack forms at weakest point in overlay

Stress concentrated at crack / joint

Overlay
Strata
PCC

Joint

Strata System

Typical Overlay
What Does That Mean for Performance?

**Strata Interlayer**
- Overlay
- Strata
- PCC
- Joint

**Simple Overlay**
- Overlay
- PCC
- Joint

**CRACK OFFSET**
- Ride is better, structure is intact

**CRACKED THROUGH TO BASE**
- Ride is worse, structure is compromised
Core Analyses

61 Strata cores at overlay cracks
- 51 not cracked through the interlayer
- 10 cracked into interlayer
  - Over undoweled patches / failing joints
- 41 cracks offset; others not checked
- No path for water intrusion

16 HMA cores at overlay cracks
- 15 cracked through to PCC joint
- Direct path for water intrusion

Cores from MO, WI, TX, KS, NJ, IL & IA projects
Other Advantages

◆ Can be recycled
  ■ Mills easily

◆ Standard HMA production & construction methods
  ■ Uses locally available materials

◆ Decreased construction time
  ■ vs fabric, grid
  ■ Lower lane closures, user delay costs
Strata System Projects

Through 2006

460 miles (3.24 million yd^2) in 21 states
I-476 Turnpike (Mile Posts 90 – 100)
Near Scranton, PA
Constructed by H&K in 2005 & 2006 season

◆ Need to extend surface life

Before

Interlayer construction

Interlayer

Finished 12.5mm Superpave Surface
Why They Tried Strata Reflective Crack Relief System

- NJ – “Benefits of thicker pavement with thinner pavement section”
- TX – “Better performance at lower cost than grid”
- KS – “Lower initial cost than white-topping”
- KY – “Complements current pavement rehab approach”
- LA – “Better crack delay, better moisture barrier & lower cost than grid”
- VA – “Cost-effective solution for cracked PCC”
Summary
Strata System Advantages

◆ Significantly delays reflective cracking longer than fabric & HMA overlays
◆ Impermeable interlayer protects pavement structure from moisture damage
◆ Lengthens pavement service life a projected 5 years or longer
◆ Recyclable
Research in Progress
NSF GOALI* Study with Univ. of IL
*Grant Opportunities for Academic Liaison with Industry

Strata System
Control

[Graph showing percentage data from March 2001 to August 2005]

[Images of road construction and materials]

[NSF logo and University of IL emblem]
Reflective Cracking Workshops

Sponsored by University of Illinois & SemMaterials

- We have hosted interactive workshops across the country to debut cutting edge technology on reflective cracking and to promote joint learning of a complex pavement problem

  - Expert panel of speakers consisting of 2 to 3 University Researchers, local DOT, & SemMaterials
  - As of April 2006, we have had 11 workshops for over 600 key attendees from 22 State DOT’s, FHWA, Turnpikes, FAA, consultants, various suppliers, contractors, Universities, Transportation Centers & Associations
  - One to Two more planned for Early 2007 in the area of this User/Producer group
Reflective Cracking Workshops
Providing Knowledge the Customer Wants

◆ Customer receives unmatched knowledge on critical “hot” topic
  ■ Research by National Science Foundation, Univ. of Illinois, and SemMaterials
  ■ How reflective cracking works through initiation and propagation
  ■ Potential product solutions and performance
◆ PDH Certificates provided for the 6 hour workshop

◆ If you are interested in attending an upcoming workshop please e-mail me at bschmitz@semgrouplp.com so we can keep you posted as locations and dates are confirmed.
Thank you.

Questions?
The Problem & The Solution

TYPICAL PROGRESSION OF CRACKS

NO DAMAGE TO STRATA INTERLAYER