2010 Midwestern Pavement Preservation Partnership Conference

West Des Moines, Iowa
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Celebrating 55 Years!

Welcome to Iowa!

Celebrating 55 Years!

ASPHALT PAVING ASSOCIATION OF IOWA
APAI

Asphalt Paving Association of Iowa

An association of Hot-Mix Asphalt producers, asphalt cement suppliers, aggregate producers, consulting engineers and industry retailers formed to insure the highest quality of asphalt is produced and placed in the State of Iowa. Established in 1955.

Benefits of Asphalt Pavements?

- Smooth
- Durable
- Quiet
- Fast Construction
- Environmentally Sustainable!

ASPHALT
is the
Environmentally Sustainable Pavement

- Perpetual Pavements
- 100 % Recyclable (RAP)
- Recycled Asphalt Shingles (RAS)
- Porous Asphalt
- Warm-Mix Asphalt (WMA)
- BioAsphalt!

What about pavement preservation?

Pavement Preservation

1. Design and construct long-lasting sustainable pavements.
2. Know the life-cycle of your pavements and plan your treatments in advance.
3. Execute the plan.

Design for Success

1. Build a strong subgrade.
2. Insure proper drainage. WATER is the ENEMY.
3. Know your traffic count – especially the percentage of trucks.
4. Stage the construction if possible.
5. Build “Perpetual Pavements”.

Perpetual Pavements

The New Asphalt, Absolutely!

ASPHALT PAVING ASSOCIATION OF IOWA
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Smooth / Quiet / Perpetual

Perpetual Pavements

Pavements requiring only periodic surface renewal

Plan for Maintenance

1. Know your local pavement history.
2. Have an index for your pavements with planned maintenance – PMS.
3. Follow the plan.
4. Be adaptable to successes and failures.
5. Use your local contractors as a resource.

Potential Early Life-Cycle Distresses

1. Crack Repair
   - Longitudinal Joint cracking
   - Reflective Cracking
   - Thermal Cracking

Longitudinal Cracking

Reflective Cracking

Thermal Cracking

Cracking

Causes:

- Reflective cracking
- Poor compaction at joint
- Poor tack coat at joint
- Incorrect PG Binder for climate
- Freeze / Thaw cycle
- Expansive soils

Solutions:

- Crack seal
- Crack seal with slurry coat
- Mill and patch

Potential Mid Life-Cycle Distresses

1. Raveling
2. Shoving / Rutting
3. Delamination / Debonding
4. Edge Cracking
5. Potholes

Raveling

Causes:

- Lack of density
- Uneven mixture
- Aging pavement, binders oxidized

- Solutions:
  - Fog Seal
  - Chip Seal
  - Micro surface
  - Thin lift Overlay
  - Mill and Fill

Shoving / Rutting

- Causes:
  - Weak Pavement Design
  - Incorrect Binder Choice
  - Not enough crushed stone content
  - Poor Compaction
  - Debonding with base course
- Solutions:
  - Leveling Course with HMA Overlay
  - Mill and Fill
  - Microsurfacing
  - Slurry Seal

Delamination / Debonding

Causes:

- Poor Compaction
- Weak tack coat between layers
- Insufficient layer thickness

Solutions:

- Partial depth patching
- Mill and Fill
- Microsurfacing

Edge Cracking

Causes:

- Weakened sub-base at edge
- Heavy loads
- Poor pavement edge support
- Poor shoulder drainage

Solutions:

- Strengthen with overlay or reconstruction
- Widen lane or stabilize shoulders
- Place subdrains

Potholes

Causes:

- Inadequate Pavement Design
- Weakness in subgrade or subbase
- Poor compaction
- Segregation of mix
- Pavement Fatigue

Solutions:

- Full-Depth Patching to necessary depth

Potential End of Life-Cycle Distresses

1. Block Cracking / Alligator Cracking
2. Poor Ride Quality
3. Joint Heaving

Block / Alligator Cracking

Causes:

- Weakness in subgrade or subbase
- Pavement Fatigue

Solutions:

- Full-Depth Patching to necessary depth
- Strengthening / Leveling course w/ Overlay
- Cold-in-Place Recycling w/ Overlay
- Reconstruction

Asphalt Pavement Rehabilitation

1. Straight Overlay
2. Mill and Fill
3. Cold-in-Place Recycling with Overlay

Straight Overlay

Advantages:

- Lowest cost
- Fast to construct

Disadvantages:

- Potential Lesser Ride Quality
- Raise height of grade

Mill and Fill

Advantages:

- Low cost
- Recycle the asphalt
- Fast to construct
- Keep grade the same
- Smooth Ride

Disadvantages:

- Little more expensive
- Adds operation

Cold-in-Place Recycling

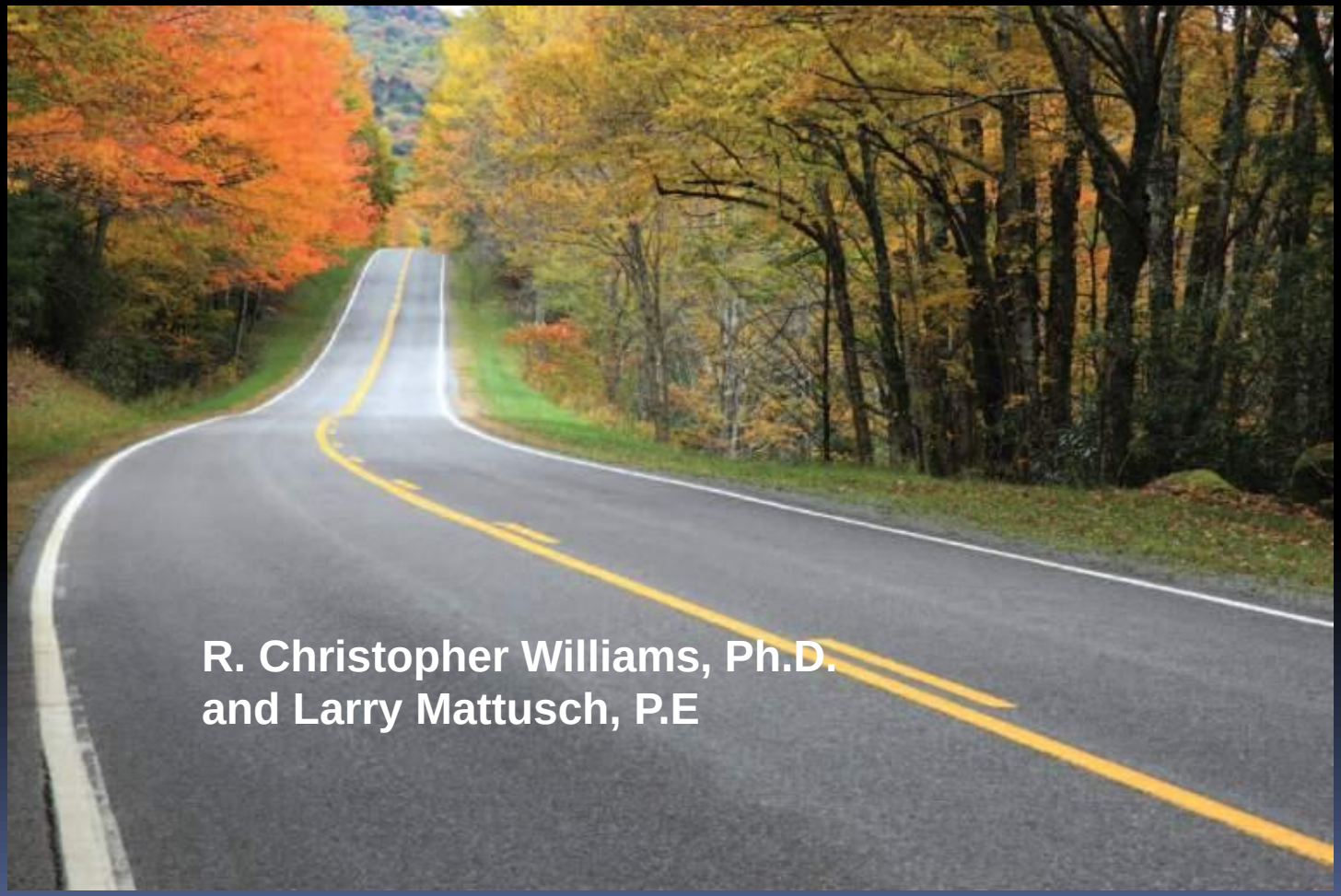
Advantages:

- Very Green Operation
- Use Existing Materials
- Controls Thermal Crack Reflection
- Smooth Ride
- Potential for Longer Pavement Life

Disadvantages:

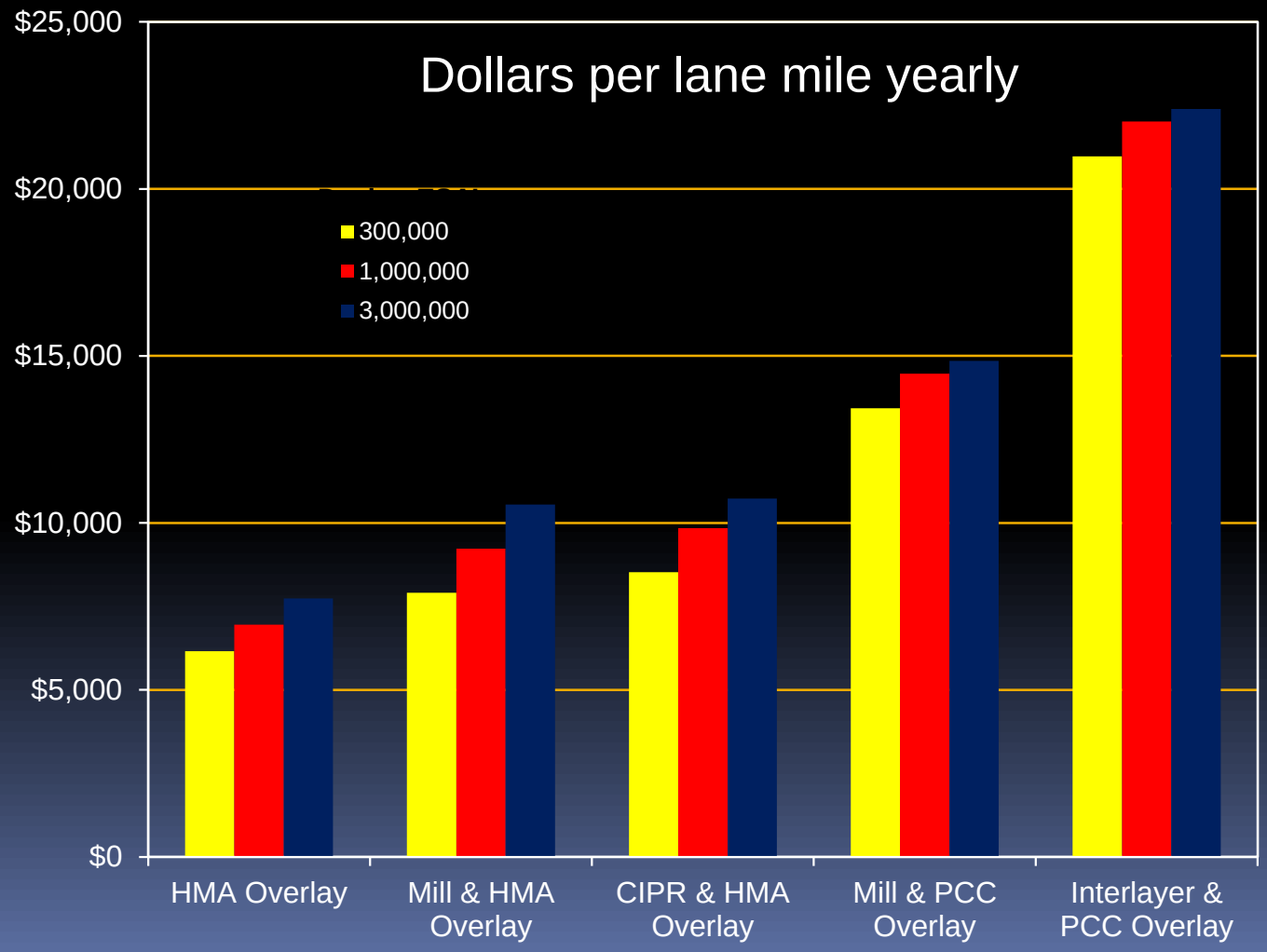
- More expensive
- Longer Construction Period

The Economic Values of Overlay Alternatives



R. Christopher Williams, Ph.D.
and Larry Mattusch, P.E

The Economic Values of Overlay Alternatives



Concrete Pavement Rehabilitation

1. Straight Overlay
2. Rock Interlayer
3. Crack and Seat
4. Rubblization

Straight Overlay of PCC

Advantages:

- Lowest cost
- Fast to construct

Disadvantages:

- Potential Lesser Ride Quality
- Reflective Cracking
- Raise height of grade

Rock Interlayer with HMA Overlay

Advantages:

- Low cost
- Fast to construct
- Retards Reflective Cracking

Disadvantages:

- Raise height of grade
- Changes Future Pavement Rehab Choices

PCC Crack and Seat

Advantages:

- Low cost
- Fast to construct
- Retards Reflective Cracking
- Can use Rock Interlayer too
- Longer Overlay Life

Disadvantages:

- Additional Cost
- Potential PCC Failures = Higher costs

PCC Rubblization

Advantages:

- Nearly eliminates Reflective Cracking
- Can use Rock Interlayer too
- Significantly Longer Overlay Life

Disadvantages:

- Higher Additional Costs
- Greater Chance of PCC Failures = Higher costs

Summary

1. Build a Strong Subgrade
2. Design for success– build Perpetual Pavements
3. Maintain PMS and keep up maintenance!

APAI Upcoming Events

- APAI Convention Dec 1-2
- Greater Iowa Asphalt Conference
  March 2-4, DM Airport Holiday Inn
- Regional Meetings:

  3/22 Sioux City
  3/23 Council Bluffs
  3/24 Des Moines
  4/5 Mason City
  4/6 Dubuque
  4/7 Iowa City

Thank you!

APAI

Is at your Service

515-233-0015

www.apai.net