


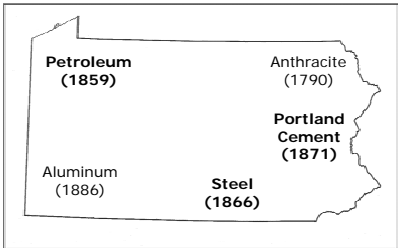
Recent Construction Material Cost Changes and Concrete Pavement Updates


The World has Changed
 ASHE Harrisburg Section
 April 2, 2007
 Construction Material
 Cost Changes & Concrete
 Pavement Updates

Outline

- Materials Economics
- Alternate Pavement Solutions
- Mix-of-Fixes
- Concrete Pavement Research
- New Tools
- Go Home, Enjoy the Evening

Manufacturing Industries with U.S. Roots in Pennsylvania

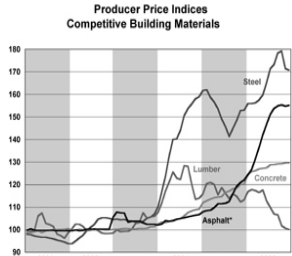


U.S. Producer Price Index

Published reports show construction materials have increased 36% in past two years.

Let's dissect this number using the December 2006 Producer Price Index:

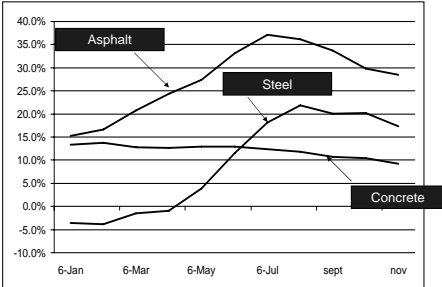
- Concrete products rose 18.9% over two years (up 10.1% for 2006)
- Asphalt prices rose 44.7% over same period (up 27.4% in 2006 alone)



Source: U.S. Department of Labor, Bureau of Labor & Statistics (Jan 2001 = 100)

Competing Material Prices

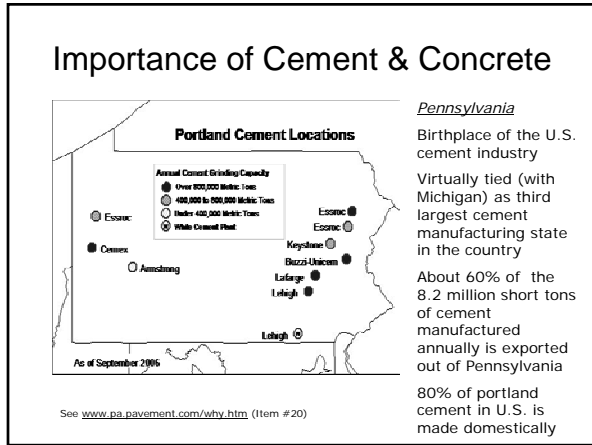
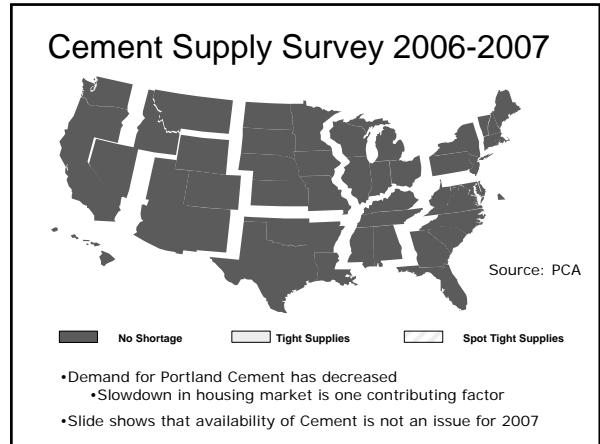
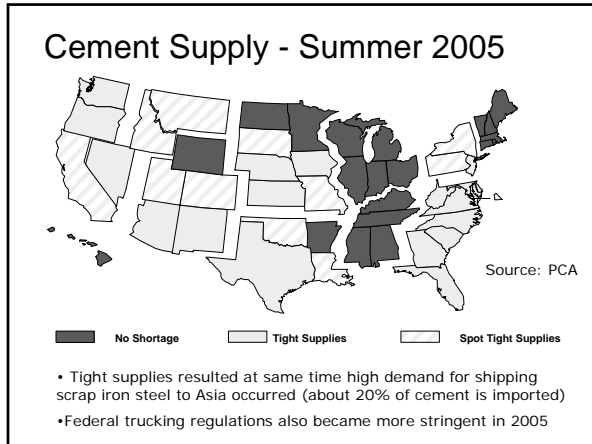
Annual Percent Change, PPI, U.S. Bureau of Labor Statistics, 2006



Construction Materials Price Indexes

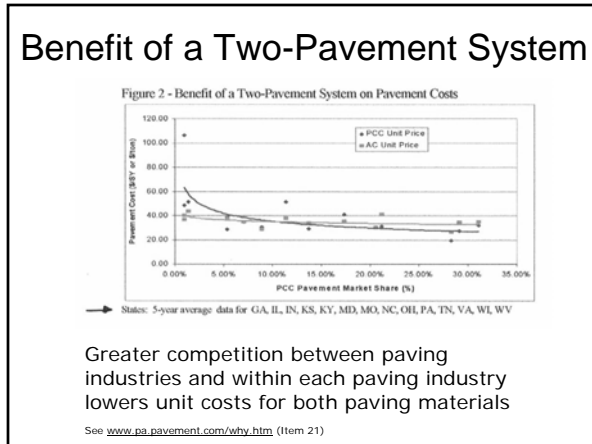
- Monthly reported data from ENR consistent with Department of Labor statistics (previous slides)
- Development of cement price escalator unsupported using ENR data.
- Asphalt price escalators, included in most contracts (using indexes as specified), have cost millions of dollars over and above the price bid for paving work.

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So how can a public agency combat this price trend?

- Recognize that the world has changed; emerging economies are here to stay
- Make market forces work for you rather than against you ... strong support for two-pavement systems and/or open and fair competitive bidding on major projects.
- Help reduce America's dependence on imported petroleum purchases by using more domestic products.



Alternate Bid Results, 2006

- I-99 (Pennsylvania)
 - Let using A+C format (used extensively by Louisiana)
 - C = \$2m for PCC, \$2.5m for PCC with AC shoulder, \$4m for AC
 - PCC with AC shoulder \$1.7m (5%) under AC bid (first cost, A component)
 - With A+C, PCC w/AC shoulder \$3.2m (9.5%) below AC
- I-90 (Ohio)
 - A+C method used, PCC option was approximately \$1m below AC on first cost. C factor differential was \$340K.
- Ontario
 - 3 projects with alternate bid, all went PCC on first cost.

Concrete Not Always the More Expensive First Cost Material!

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Long Term View on Infrastructure

- Bridges
 - Pennsylvania bridges are on average over 50 years old (third oldest in Nation)
 - 23% of 25,313 bridges in Pennsylvania are structurally deficient
 - To address this problem, PENNDOT currently pursuing 100+ years of service as a must for bridge replacements

- How can we also incorporate longer-term solutions for our aging pavements?

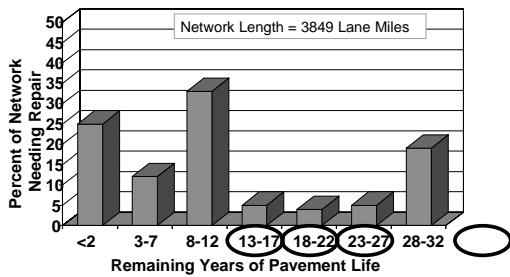
Long Term View on Infrastructure

- Longer-Life Pavements
 - Deeper foundations
 - Denser bases
 - Permeable bases used only in United States
 - Two-lift construction
 - Possible solution for addressing long-term availability of high quality aggregates
 - Design Catalogues
 - To highlight and incorporate the best practices for long-life pavements
 - Get In, Do it Right, Get Out, Stay Out
 - Reduce traffic disruptions (day and night) by interrupting the traveling public less often

Observations from the 2005 Scanning Tour on Long-Life Pavements

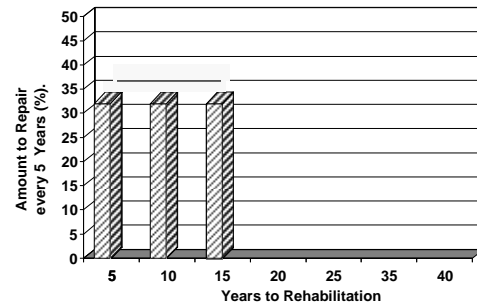
Network Impact, Mix-of Fixes

Look for the "Structural Holes" and fill them



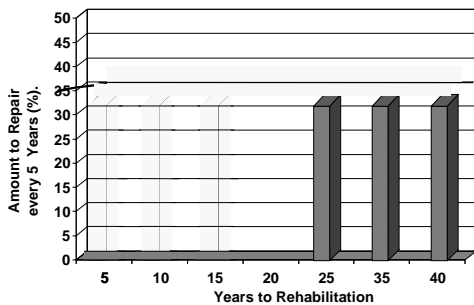
Michigan DOT: District 8 - Current Condition

Network Impact: (Short-lived solutions)



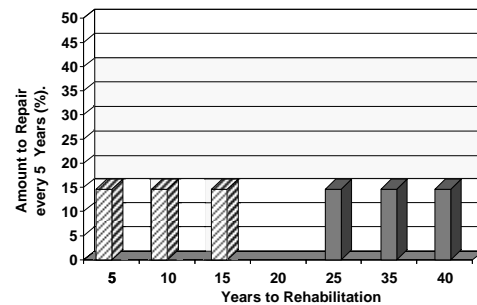
Future infrastructure challenges and burdens are passed on to our children

Network Analysis: (Long-term solutions)



Infrastructure challenges and burdens are solved for the next two generations

Network Analysis: (Mix of Fixes)



Infrastructure challenges & burdens are spread across three generations

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Long-Term CP Research Plan

CP Road Map

- Finalized in 2005
- Co-developed by FHWA and the PCC Center, **with industry input**
- Roughly a 10-year concrete pavement research program.
- 250 research problem statements in 12 tracks
- \$250M in needs identified.



Hallmarks of the CP Plan

- Not owned by any one organization
 - Not tied to any one funding source
 - To be cooperatively conducted by researchers across the country
 - Leverages ideas and funds
 - Promotes cooperation and synergy
 - Merges research and implementation
- Unity through common goals***

The CP Tech Center

- Located at Center for Transportation Research & Education (CTRE) at Iowa State
- Started as PCC Center in 2000
- Partnership with ACPA
- Collaborative guiding philosophy
- Administrative and support capabilities

Federal Appropriations

- 2005-2009 concrete pavement research funding in SAFETEA-LU (administered by FHWA):
 - \$10M through CP Tech Center
 - \$16.4M additional research
- Other funding sources to be leveraged with this funding

What the CP Center Will Do


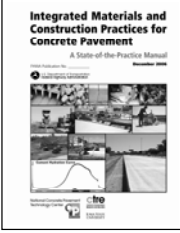
- Support the principles of the National CP Road Map
- Coordinate research through sharing of information
- Help researchers across the country access the right resources and partnerships
- Provide tech transfer
- Accelerate implementation



www.cptechcenter.org

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New CP Tech Center Tool
INTEGRATED MATERIALS AND
CONSTRUCTION PRACTICES:
A State-of-the-Practice Manual

IMCP MANUAL
www.cptechcenter.org

Goals for the IMCP User


- Understand concrete pavement construction as an integrated system
- Understand and implement new technologies, tests, and best practices.
- Appreciate factors that lead to premature distress in concrete, and learn how to avoid or reduce them.
- Obtain how-to, troubleshooting info quickly.

What is in the IMCP Manual?

1. Introduction
Why bother reading this manual?
2. Pavement Design
What will the pavement look like?
3. Materials
What materials do I have to work with?
4. Chemistry of Hydration
What happens during the formation of the concrete matrix ?
5. Critical Properties
What do I need?

What is in the IMCP Manual?

6. Mix Proportioning
How do I Get What I Want?
7. Preparation
What is Underneath?
8. Construction
Doing It !
9. Quality and Testing
Have I got it right?
10. Troubleshooting
Oh 🙄🤔👎👹 Darn!

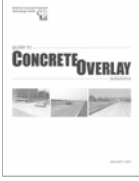




On the web at www.cptechcenter.org

New CP Tech Center Tool

-Concrete Pavement Overlays Document

- Interest in PCC overlays has grown tremendously in last decade
- Significant recent research
 - FHWA (ISTEA Section 6005)
 - NCHRP and ACPA Studies
 - State studies
 - LTPP
- ACI-325 is a comprehensive document on overlays but not in user friendly format








Why are we not using Concrete Resurfacing Technology more?

Perception:

- Pavement design theories for bonded and unbonded overlays (resurfacing) are difficult to understand
- There is lack of confidence in overlays because many don't understand how they work







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CP Technology Center Advisory Board

- Develop a user friendly “go to” manual with training
 - provide the user with a simple, but educated choice
- Form partnerships between states
 - Share experiences and knowledge
 - Provide assistance
- One single comprehensive document

Concrete Overlays Program


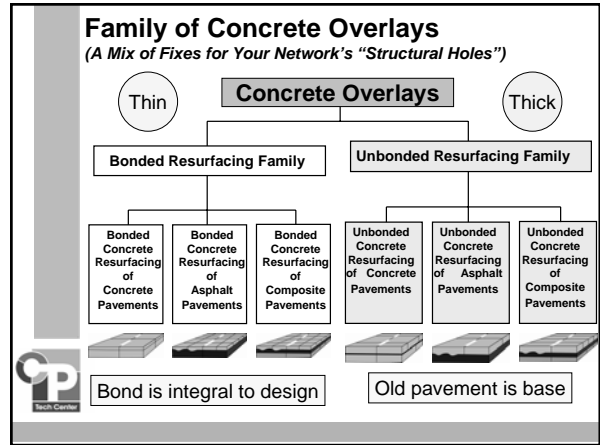
	Products	Schedule	Funding
Phase 1. Overlay Guide	28- Guide to Concrete Overlays	2006 develop 2007 print	CP Tech Center
Phase 2. State Projects/Support	<ul style="list-style-type: none"> □ 8 state projects □ Technical Assistance □ Lessons learned □ Workshops 	2007/2009	FHWA/ISU Cooperative Agreement
Phase 3. Overlay Manual	150+ page overlay manual	2008/2009	Undetermined at this time



Why Concrete Overlays?

Advantages

- Do not require extensive repairs of existing pavement
- Quick to construct
- Long performance lives
- Low maintenance requirements
- Withstands heavy truck traffic
- Effective life-cycle costs
- Recyclable

Training & T2 Opportunities

- Concrete Pavement Restoration
 - Three Sessions Presented in Early 2007
- Concrete Paving Best Practices
 - May 30 or 31 (Uniontown)
- Concrete Pavement Bus Tour
 - June 27-28 (Uniontown)
- IMCP Training
 - Fall 2007 (TBD)
- Annual PA Concrete Conference
 - January 29-31, 2008 (Grantville)

www.pa.pavement.com

Thank You!

www.pa.pavement.com

Please also visit
PAVEMENTS4Life.com