

CP Road Map Task Order #3 Proposed New Approach for Operations Support



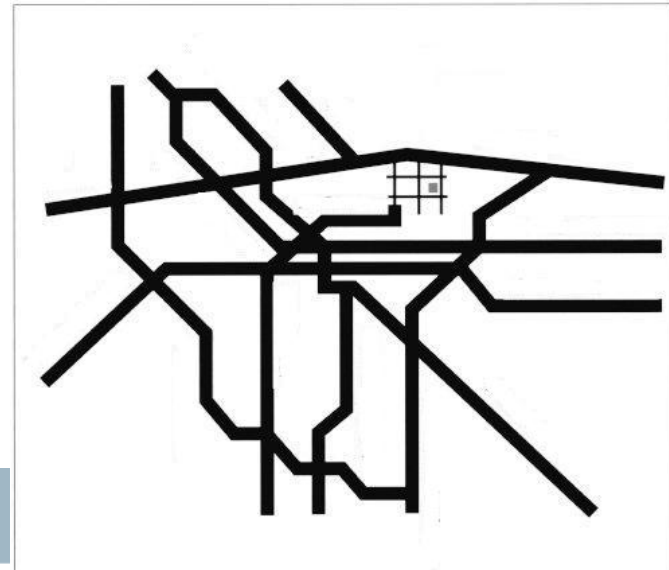
Presentation Outline

- Activities completed with initial contracts
- Challenges of current approach
- Description of proposed new approach
- Advantages/challenges of proposed new approach



The CP Road Map?

- A strategic plan for concrete pavement research and technology
 - ✓ To meet the paving challenges of the future
 - ✓ To guide the investment of research dollars
 - ✓ To promote cooperation among fund managers and all stakeholders



Road Map Accomplishments

- Priority tracks selected, leadership teams formed, track leadership meetings held, and framing documents developed
- Exec Board meetings held
- Communications and marketing completed:
 - ✓ “It’s Your Move” campaign to state DOTs for OSG Pooled Fund
 - ✓ Web site updated
 - ✓ Presentations made
 - ✓ TRB workshop sponsored



Tracks

1. **Mix Design and Analysis**
2. **Performance-Based Design Guide**
3. **Nondestructive Testing and Intelligent Construction Systems**
4. **Surface Characteristics**
5. Pavement Equipment Automation
6. Joint Design, Materials, and Construction
7. **Rehabilitation and Construction**
8. Long-Life Concrete Pavements
9. Accelerated and Long-Term Data Collection
10. Performance
11. **Business Systems and Economics**
12. Advanced Concrete Pavement Materials
13. **Concrete Pavement Sustainability**



PRIORITY TRACK PROJECTS

Mix Design and Analysis

- Projects led by State DOTs are being set up to address specific needs:
 - ✓ Joint Deterioration (South Dakota)
 - ✓ Permeability test methods (Indiana)
 - ✓ Air void system requirements (Michigan)
 - ✓ Development and implementation of tests verifying mix performance (Iowa)
- Publications
 - ✓ Design and Control of Concrete Pavement Mixtures (ACPA & PCA)
- Software
 - ✓ A project by FHWA to coordinate the various software packages that they already have had developed. These include COMPASS, HIPERPAV, and COST



PRIORITY TRACK PROJECTS

Design Guide

- Short-Range Research and Implementation Projects
 - ✓ Concrete Overlays
 - ✓ Concrete Tie Bars (ACPA)
 - ✓ Bonded overlay design (MnROAD)
- Longer Range Research Projects
 - ✓ Develop an Integrated Concrete Materials Modeling and Design/Analysis Tool
 - ✓ Development of Improved JPCP Deterioration Models
 - ✓ Design of New and Innovative Concrete Pavement Type Design
 - ✓ Further development of parameters for the MEPDG
 - ✓ Design of composite pavements



PRIORITY TRACK PROJECTS

Non Destructive Testing

- Short term implementation needs:
 - ✓ Develop equipment performance specifications for curing monitoring system similar to SmartCure
 - ✓ Search for funding mechanisms or incentives to further implement available real time smoothness and/or texture monitoring systems.
- Long term research projects:
 - ✓ Assess real-time measurement needs and techniques for concrete mix properties and variability
 - ✓ Develop causality links between paving operations and mix properties/variations on changes to pavement smoothness and texture.
 - ✓ Identify techniques and technologies to properly measure air void system in the appropriate location on the paving operation.



PRIORITY TRACK PROJECTS

Surface Characteristics

- Development of an Integrated Functional Classification System for concrete pavement surface characteristics
- Refinement of models to relate pavement texture to noise, friction, splash & spray, and other concrete pavement surface characteristics
- Characterizing design and construction elements in concrete pavement surfaces
- Training for improved surface characteristics through better practices in concrete pavement design, construction, and maintenance
- Improved concrete pavement texture evaluation



PRIORITY TRACK PROJECTS

Rehabilitation and Construction (Subtrack)

- Overlay design
 - ✓ Development of a guide for concrete overlay design using existing methodology
 - ✓ Development of new concrete overlay thickness design procedures (long-term).
- Overlay field research that would help solve construction technique limitations.
- Determination of the required quality of bond breaker for unbonded overlays
- Preservation and rehabilitation tech transfer



PRIORITY TRACK PROJECTS

Business Systems and Economics

- *Evaluate the impact of alternative bidding for asphalt-concrete solutions.*
- *Study design-build, best value, design-build-maintain, and public-private partnerships should be considered .*
- *Evaluate the effectiveness of incentives*
- *Determine an effective accelerated technology transfer and rapid education programs for the future concrete paving workforce.*



PRIORITY TRACK PROJECTS

Sustainability

- *The framework for this track is not established yet, but the common points of interest among the participants of the first team meeting held on July 23rd, 2008, in Chicago, IL, are as follows:*
- *Measurement including tools, evaluation, and Life Cycle Analysis*
- *Education*
 - ✓ *Define terms and jargon*
 - ✓ *Current practices briefing document*
 - ✓ *Best practices recommendations*
 - ✓ *Specifications (must get technical people involved vs. politicians)*
- *Get more efficient with materials (cut emissions, energy, non-renewable materials)*
- *Other environmental elements (lighting/heat/noise/etc)*



Current Approach for TOPR #3

- Executive Committee
 - ✓ One face to face meeting
 - ✓ Others via electronic media
- Work with Priority Track Leaders to develop project objective statements for priority projects and provide to funding agencies
- Assist in developing funding mechanisms
- Follow up meetings with Priority Track Leadership Teams
- Complete framework document for the Sustainability track
- Continue communications program



Current Approach - Successes

- ✓ Has strong industry/state support
- ✓ Executive Committee members are active, enthusiastic, supportive
- ✓ Through Mix Design Leadership, National Concrete Consortium (20 State DOTs) supports Road Map



Current Approach - Successes

- ✓ Website organized
- ✓ Five tracks have established priorities and developed a list of priority research topics
- ✓ Work was begun on all 7 priority tracks
- ✓ Workshop held at TRB in 2009 and others planned for the future



2005 Annual Model Budget For Full Funding of Road Map Operations Group

	<u>Budget</u>
Administration, includes Project Management System	\$100,000
Administrative Support	\$80,000
Communications	\$100,000
Collaboration	\$140,000
Database	\$100,000
Outreach	\$60,000
Track Coordination	\$120,000
Travel	<u>\$50,000</u>
TOTAL	\$750,000



Current Approach - Limitations

- Operations support not fully funded in comparison to model budget:
 - TOPR #1, 2006: \$285,000
 - TOPR #2, 2007: \$329,000
 - TOPR #3, 2009: \$235,000 (FHWA)
 - » \$40,000 (Industry)
 - » \$58,000 Pooled Fund



Current Approach - Challenges

- ✓ 7 priority tracks running instead of 5 originally agreed to causes additional work with no additional funding
- ✓ Work activities and funding restraints prevent direct meetings with research sponsors and State DOTs
- ✓ Getting research sponsors at all levels to adopt Road Map priorities is a slow process since each agency has different operations policies



Current Approach - Challenges

- Progress has been slower than desired on:
 - ✓ Coordinating Road Map priorities with research sponsors
 - ✓ Developing state and industry leadership / champions
 - ✓ Developing project management systems
 - ✓ Marketing states' pooled fund for operations support

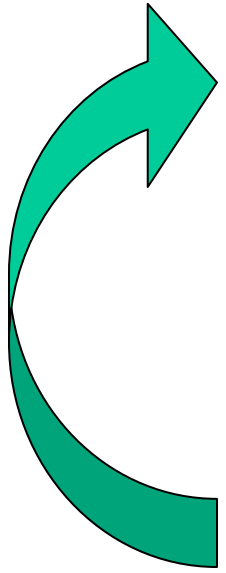


Major Research Sponsors and Funding Amounts

- **TRB – Concrete Related Projects**
 - \$6,750,000
- **FHWA – SP & R**
 - DOTs - \$124,000,000
 - NCHRP - \$36,000,000
- **DOTs**
 - State funded projects
- **Industry: ACPA; PCA; RMC**
 - Nonspecific amounts – project specific



Proposed New Approach



- Operation Support Group (OSG) listens to researchers, DOTs, and industry for research needs **through face to face meetings or video conference meetings**
- Track Leadership Teams recommend priorities to Executive Committee
- **OSG helps connect funding and researchers through DOTs and Industry**
- **OSG assists in implementing technology transfer programs**



Proposed New Approach (cont.)

- Industry rep and OSG sets up meeting with DOT, in-state university researchers, and OSG
 - ✓ OSG explains Road Map
 - ✓ Determine research needs of each DOT
 - ✓ Determine research capabilities of each university
 - ✓ Develop collaboration between DOT/University and others interested in same topic(s)
 - ✓ Develop contact list



Proposed New Approach (cont.)

- OSG updates information about research projects based on information from DOT and University staff
- OSG assists in development of technology transfer publications
 - ✓ OSG receives national research reports from University researchers
 - ✓ Develops technical briefs annually summarizing the national research and disseminates them
 - ✓ OSG coordinates/prints DOT's research project summaries connecting them to the Road Map
 - ✓ Sustainability track framework will be developed





CP ROAD MAP
Research Projects Identification (2009)

National Dissemination of Research

Summary of Research Projects by agency
(Recently Completed & Ongoing)

Booklet Format (8 1/2" x 11")
2 projects per page Numbers = 100 to 200
Numbers 100 to 200

Web Based Key Word Search

Select Research Projects (On-going and past 2 years)

Determine

- Objective
- Results
- Benefits
- Implementation

Tech Briefs (3-4 pages)
10-12 Research Projects that Substantially
Advances Concrete Pavement Technology

Web Based

Non Research Field Trial Applications
(Methods or Processes that are Known to Work)

Booklet Format (8 1/2" x 11")
3 projects per page

Web Based

Non-research
Field Trial Applications
for Concrete Pavements

CP ROAD MAP
shaping the future of concrete pavement

Mix Design Program CP Road Center Project Booklet 12

Materials & Mix Optimization for Concrete Pavements

NEED & OBJECTIVES
Severe environmental conditions, coupled with the routine use of deicing chemicals and increasing traffic volumes, place extreme demands on concrete pavements. Although in most instances engineers have been able to specify and build concrete pavements that meet these challenges, some reports of premature deterioration could not be specifically attributed to a single cause. The objective of this project included the evaluation of the important variables that impact the homogeneity of concrete mixtures.

FINDINGS & CONCLUSIONS

- Ternary mixtures show significant promise for improving the performance of concrete mixtures.
- The presence of basaltic coarse aggregates to inhibit premature drying problems (false sets).
- Fly ash helps to reduce the impact of premature drying because it behaves like a low-range water reducer in most instances.
- The premature drying problem can also be alleviated by increasing the water-cement ratio of the mixture and providing a remix cycle.

PRODUCTS & BENEFITS
Since no evidence of premature distress has been observed in the last decade, it appears that the development and implementation of the current quality assure concrete mixture program in Iowa has resolved previous problems. Other states may derive benefit from the results of this research.

SPONSORS
Iowa Dept. of Transportation
Iowa Highway Research Board (IHRB)

RESEARCH LEAD
Iowa State University

FUNDING
\$120,000

STATUS
Completed (March 2008)

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FOR MORE INFORMATION
www.cprmap.org

CP ROAD MAP
shaping the future of concrete pavement

TRACK 4 - SURFACE CHARACTERISTIC

Design and Construction Practices to Reduce Tire-Pavement Noise on Concrete Pavements

it's your move!

INTRODUCTION/Problem Statement
Typically, all of the concrete pavement sections, materials, and equipment used today have the potential to produce quiet concrete surfaces. These quiet surfaces can be built, even in existing transportation noise, pavement do not need to be resurfaced and repaired. In fact, a combination of surface preparation and other factors - for example, design, construction practice, age, climate, and traffic - makes concrete pavements loud or quiet.

The latest guidance developed for this project are designed to help the concrete paving industry construct quieter pavements. The guidelines include better practices for the help engineers.

Key Factors Affecting Tire-Pavement Noise
Information gathered from 1,500 test pavements throughout North America and Europe has helped engineers identify the properties that contribute to pavement noise. Table 1 summarizes the relationships between several important concrete pavement surface characteristics and tire-pavement noise.

Length of time of a newly placed concrete surface



March 2009

PAS 7-1

**TRACK 7—High-Speed
Concrete Pavement
Rehabilitation and Construction**

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*Nonwoven Geotextile
Interlayers for Separating
Cementitious Pavement Layers:
A Report of European Practice
and U.S. Field Trials.*
Rasmussen, R.O., and S.I. Garber.
2009. Austin, TX: The Transtec
Group. (Sponsor: FHWA)

MORE INFORMATION

Using Nonwoven Geotextile Fabric to Separate Cementitious Pavement Layers

This technical brief provides information about a promising technology that agencies and contractors can apply now to enhance their concrete paving practices. The technology is the use of nonwoven geotextile fabric to separate two cementitious layers in a pavement system.

This document discusses the characteristics and availability of such fabrics in the United States, recent field tests in two states, best construction practices based on the field tests and European experience, and issues requiring additional research.

Background

In May 2006, representatives of public and private organizations in the United States participated in a European scanning tour on long-life concrete pavements. One focus was German pavement systems with cement-treated bases and jointed concrete pavement surface layers. Despite carrying significant traffic loads, these pavements are of excellent quality and have long lives.¹

Unlike common U.S. practice, the cementitious pavement layers in German systems are separated by nonwoven geotextiles. German engineers have been using non-woven geotextiles in this way for 25 years (see sidebar on page 2).

Tour participants recommended that similar uses of nonwoven geotextiles be field tested in the United States. They also recommended that field tests determine if non-woven geotextiles can perform effectively as a

long-term separation layer between existing concrete pavements and new concrete overlays.

What do we need to know?

In the United States, hot-mix asphalt (HMA) is traditionally used to separate cement-bound pavement layers. In the case of unbonded concrete overlays on concrete pavements, a 1-in thick HMA separation layer is typically required.

To determine if nonwoven geotextiles can perform as a useful alternative to HMA in these applications, answers are needed to these questions:

1. What kinds of nonwoven geotextiles, if any, can perform these functions well and are available in this country?
2. What construction practices should be followed to optimize nonwoven geotextiles' performance as a separation layer?

Continued on next page



Core showing nonwoven geotextile interlayer between surface concrete (left) and underlying pavement (right) [Cite source]



Advantages of Proposed New Approach

- More direct connection with DOTs versus written communication
 - ✓ Determine research needs of each DOT
 - ✓ Help connect Industry, University, and DOT research needs/interests
 - ✓ Extends visibility of CP Road Map to major stakeholders
- Develop OSG working relationship with University researchers versus no relationship under current program
- Connect researchers with those interested in similar topics versus groups doing duplicate research projects



Advantages of Proposed New Approach (cont.)

- Potential for tailored projects to match researchers interest/capability
- Improve potential for AASHTO committee or TRB committee research interest through DOT contact
- Break down perception that the CP Road Map only involves major researchers
- Implementation of technology transfer of research results



Challenges of Proposed New Approach

- Time required to coordinate Industry, DOT, University, and OSG staff to set up meetings
- Potential difficulty in getting the correct industry, DOTs, and University people together for discussions
- Time to review research reports and develop the tech briefs



WE NEED YOUR HELP!

Identify contacts

- DOT staff – Upper Management
 - Chief Engineer; Research Director; Finance Director;
- University researchers with concrete pavement/materials interest
- Industry – Chapter/State Director; Major Contractors; Suppliers



WE NEED YOUR HELP!

Industry Coordinated Meetings

- Determine type of meeting
 - Teleconference
 - Face to face
- Follow-up with identified DOT, University Researchers, and other Industry people to set up the meeting



WE NEED YOUR HELP!

DOT Staff

- Reinforce importance of meeting/attendance to University researchers
- Assemble information on research project activities over the past 2-3 years – where have you spent your money
- Determine important field trial applications

