



Concrete Pavement Road Map

Virginia Concrete Conference

Federal Highway Administration
Iowa State University
TDC Partners, Ltd.
The Transtec Group, Inc.
Applied Research Associates



CP Road Map (OPTION 1)

What is the CP Road Map?

Long-Term Plan for Concrete Pavement Research and Technology

A new, comprehensive, strategic plan for concrete pavement research and technology



CP Road Map

Who sponsored the CP Road Map?

- FHWA
- Iowa State University
- Concrete Pavement Industry

CP Road Map

Who were the principals?

Federal Highway Administration
Peter Kopac, AOTR

Principals
Dale Harrington, Iowa State University, Contract Admin.
Ted Ferragut, TDC Partners, Principal Investigator
Rob Rasmussen, The Transtec Group, Inc.
Mike Darter, ARA

Others
Ted Neff, Peak Management
Dave Fowler, U of TX Austin
Kejin Wang, Iowa St. U
Lev Khazanovich, U of MN
Dan Zollinger, TX A&M
Jim Cable, Iowa St. U
Scott Schlorholtz, Iowa St. U
many more

CP Road Map

What did we develop?

Long Term Plan for Concrete Pavement Research and Technology




Research Management Plan

CP Road Map

Why the CP Road Map?

To meet the paving challenges of the future

To guide the investment of research dollars for the next ten years

To promote cooperation among fund managers and all stakeholders

What's unique?

- Strategic
 - 250 Statements in 12 Integrated Tracks
- Innovative
 - Beyond knowledge towards opportunities
- Ownership
 - Belongs to all stakeholders

What's unique (cont)?

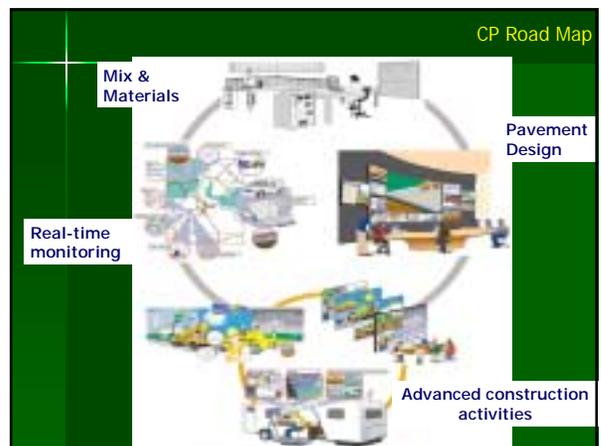
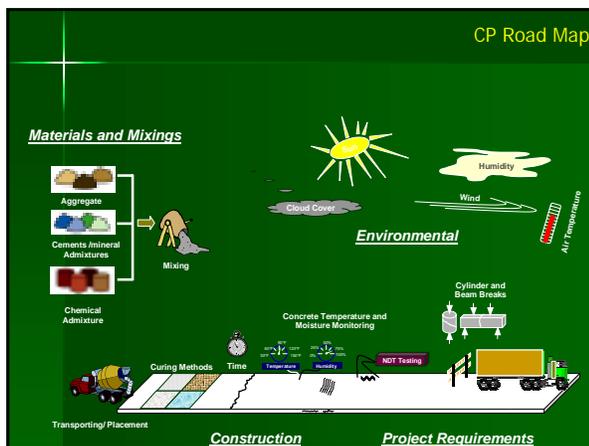
- Long Term
 - 10 years
- Estimate
 - \$250,000,000 including implementation
- Boundaries
 - Only your imagination limits you!!

And the process?

- Literature reviews
- Outreach with the *community* worldwide
- Identification of *gaps*
- Identification of *advancements*

Unifying Vision

By 2015, we will have a comprehensive integrated technology and business system that provides innovative concrete pavement solutions to meet customer's performance requirements.

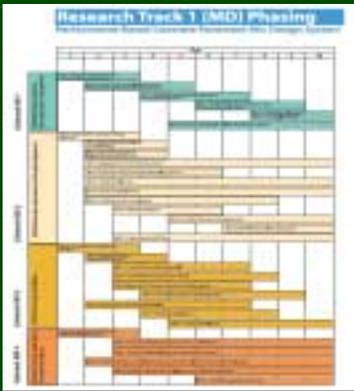


Objectives

- To integrate design, mix and materials, and construction with pavement performance prediction
- To improve reliability
- To maximize public convenience
- To improve the driving experience
- To identify new business relationships
- To constrain costs while improving performance
- To protect and improve the environment
- To expand opportunities to use concrete pavements
- To educate the new workforce quickly and efficiently

Research Tracks

- 12 Major Research Tracks
- Goal-oriented definable products
- Budget \$250M
- Timelines 10 years on average
- In essence, many research programs along with integration across track lines.



Problem Statement

Design and Build Pavement Widening and Overlay Projects

Background:

Many rural concrete highways are narrow (e.g., 18 to 20 ft) and must be rehabilitated to correspond to current safety and geometric standards for lane widths and shoulders. Agencies have struggled with the design of these pavement rehabilitations, and often problems develop due to inadequate design of the widening. Procedures to rehabilitate these sections effectively and economically with concrete are needed for immediate use. These procedures need to be mechanistically based so that the existing pavement and the widening and overlay can be modeled structurally.

- Task 1. Procedures to evaluate the existing pavement, including the soundness of the concrete slab and any HMAC layers on top of the slab.
- Task 2. Procedures to design a suitable widening for traffic lanes and shoulders.
- Task 3. Procedures to design a concrete overlay that would cover all traffic lanes and, if needed, the shoulders.

Track: Stand Alone
 Cost Range: \$250-500K
 Phase: N/A
 Implementation: experimental projects

Performance-based Mix Design System

- From equipment to process to analysis – industry's own!!
- Lab of the Future - rational laboratory procedure
- Mix Optimization w/advanced modeling
- Integration with design and field quality control
- Compatibility of constituents
- Mix designs for smoothness and noise



Performance-based Design Guide

- Beyond the AASHTO Design Guide
- Pavement preservation and restoration
- All concrete design in one place



High Speed NDT and Intelligent Construction System

- Continuous monitoring of construction operations to improve process, quality control, and pavement management
- Full systems monitoring and intelligent equipment response to smoothness, consolidation, strength, curing, steel location and more



Optimized Surface Characteristics

- Safe, Quiet and Smooth
- Tailored to meet predetermined conditions for friction, noise, smoothness, splash and spray, light reflectance, and rolling resistance

CP Road Map

Equipment Automation and Advancements

- From batching to placement to curing to one-pass installation of sub drains



Innovative Joint Design, Materials, & Construction

- Cross cutting – from design to performance
- Aiming for breakthrough technology to supplement dowel technologies



CP Road Map

High Speed Rehabilitation and Construction

- From planning to simulation to pre-cast to major recycling to and one-pass remove and install concrete pavements



Long Life Concrete Pavements

- From 30 to 50 years and beyond, with reliable and cost effective pavement solutions



CP Road Map

Accelerated & Long Term Data Collection

- Accelerated testing; test roads, beyond LTPP, to collect, store and retrieve the next generation of pavement data accurately, quickly, and efficiently




Pavement Performance

- Pavement management and feedback systems, including sensors embedded in the pavement

CP Road Map

Business Systems and Economics

- Roles and responsibilities and economic strategies for the future including innovative contracting, economics for various pavement solutions, sustainability, public-private partnerships and an new technology transfer system



Advanced Materials

- From idea to lab to field to service to meet special conditions, environmental challenges, and faster construction



CP Road Map

Research Management Plan

- Not owned by one organization
- Truly a national plan
- Voluntary participation
- Not tied to one fund

Unity through Common Goals

CP Road Map

Research Management Plan

- Endorsement by organizations with research funding and expertise
leads to
- Coordination on specific research efforts
leads to
- Sharing fruits of Cooperation

Research Management Plan Benefits

- Supportive of national goals
- Leverage ideas and funds
- Develop synergy among active partners
- Validate research ideas continuously
- Maintain control of funds and projects



Executive Advisory Committee

Research Track Leaders

Administrative Support Group

Executive Advisory Committee

- Sustaining Organizations
 - FHWA
 - ACPA
 - AASHTO, DOTs
 - PCA, NSSGA, others



Executive Advisory Committee

- Integration across Tracks
- Partnering and Fund Requirements
- CP Road Map Status and Updates
- Communications and Outreach Mgt
- Innovative Research (CP-IDEA)
- Administrative Support Group Guidance



Research Track Leaders

- Leadership and guidance
- Scope identification and adjustments
- Technical details
- Budget adjustments
- Project integration



Administrative Support Group

- Executive Committee support
- Research Track Leaders support
- Partnering arrangement facilitation
- Integration across track lines
- Database management
- Technical Expert Working Group support
- Software & intellectual property issues
- Technology transfer
- Communications and outreach execution



How to get started?

- Identify CP Road Map transition team & seed funds
- Identify key organizations and leaders – MI???
- Establish Track Leaders
- Establish Administrative Group
- Establish Senior Steering Committee
- Promote and coordinate research
- Update the plan continuously
- Communicate and publicize

Why is this important to Virginia?

- Defines the VA research and technology agenda, not just U.S.
- Addresses VA emerging roles and responsibilities
 - VA DOT today is different from yesterday & tomorrow
 - VA industry has new and important roles
- Leverage VA \$\$
- Accelerate VA innovation
- Promotes VA's image before the nation and the world
- Create new markets for VA products and expertise

Why is this important Virginia?

And finally,

Because your public deserves creative visions, creative solutions, and the creative energy to make the Commonwealth the best it can be.

On behalf
of
FHWA and Iowa State University

Thank You