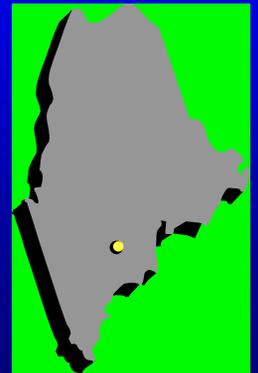


National Concrete QA Program



Michael F. Praul, P.E.
Engineering Team Leader
FHWA--Maine Division



Why

- 23CFR637
- States move to QA
- No existing leadership for concrete QA
- FHWA National QA reviews
- MaineDOT QA evaluation
- Inspector General Report: June 2007
 - Quality Assurance in Materials and Construction
 - Development of guidelines
 - Results from Central Artery Tunnel Project





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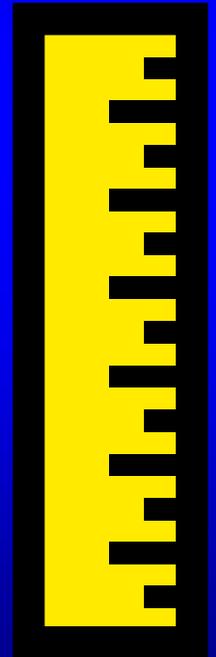
Common Measurables

Concrete

- Strength
- Air
- Cover
- Chloride
- Permeability
- w/c ratio

HMA

- Density
- AC content
- Volumetric properties
- Rideability



Some Non-measurables

- Curing
- Cold weather practices
- Hot weather practices
- Consolidation
- Stockpile management
- Workmanship

Quality Assurance for Concrete

--Issues--

- Non-measurables; impact on quality
- Industry issues
- Statistical issues



National Concrete QA Program Team

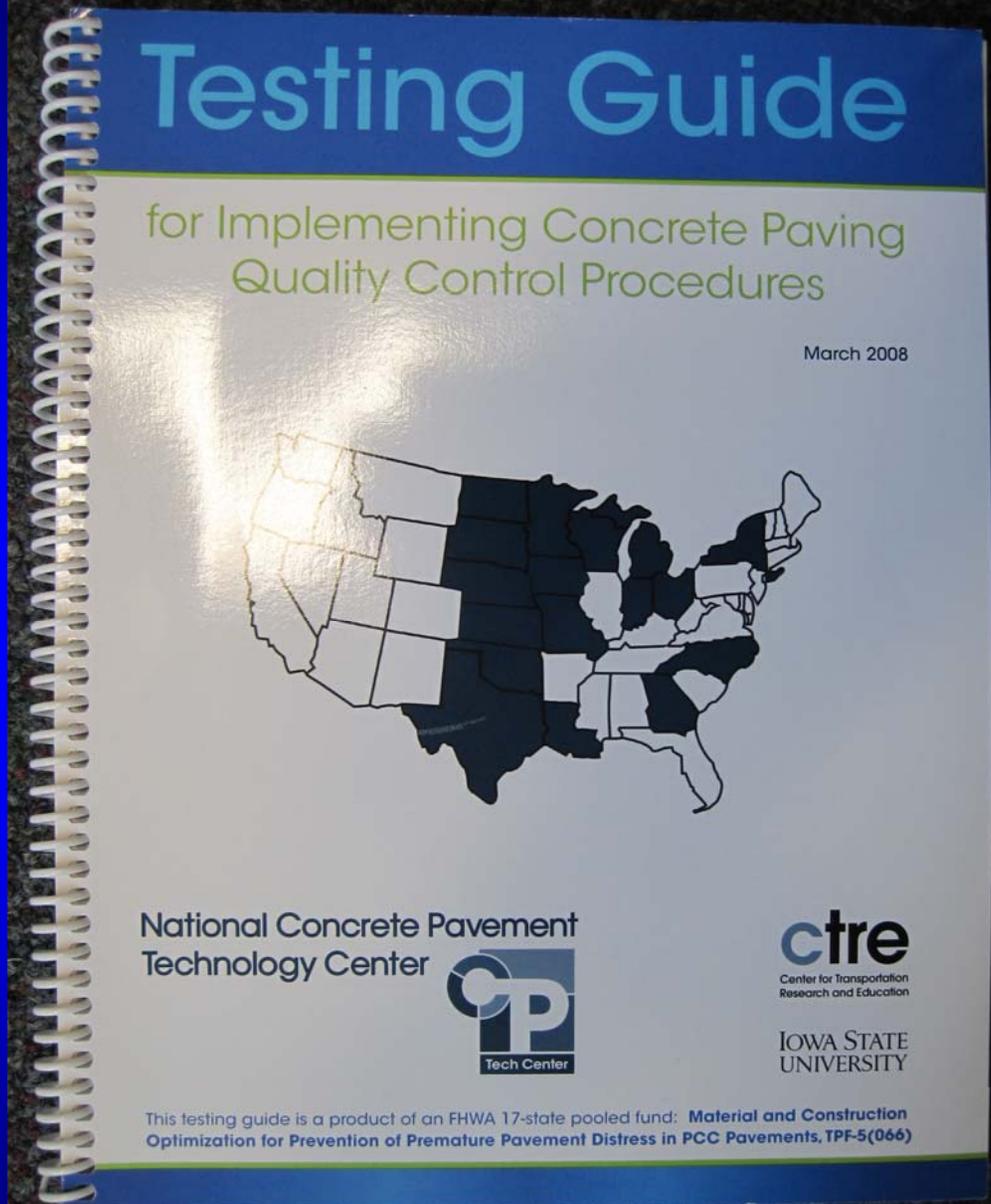
- Jim Grove (Chair), FHWA consultant
- Suneel Vanikar, FHWA
- Gary Crawford, FHWA
- Dennis Dvorak, FHWA
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- Celik Ozyldirim, VTRC
- Leif Wathne, ACPA
- Jim Parry, WI DOT
- Maria Masten, MN DOT
- Brett Trautman, MO DOT
- Pete Capon, Reith-Reilly

Objectives

- Provide agencies/contractors with guidelines for QA programs, including QC and acceptance procedures
- Utilize pooled fund Testing Guide
- Develop companion Inspection Guide
- Maximize use of FHWA Mobile Concrete Lab
- Promote concept that QA is more than just testing
- Increase knowledge base of both agency and contractor personnel

Testing Guide

- National Concrete Pavement Technology Center (Iowa St.)
- 17-state pooled fund
- Issued in 2008
- Extensive QC program guidance
- Suggested acceptance program



Inspection Guide

- Elements of the concrete paving process
- What do you check
- What do you test
- Trends and control charts
- Using test results to avoid problems
- Quality is everyone's job



Inspection Guide

- Iowa DOT guide
- ACPA materials
- Other states
- Industry

PORTLAND CEMENT CONCRETE PAVING



FIELD INSPECTION 2008

TECHNICAL TRAINING & CERTIFICATION PROGRAM



HIGHWAY DIVISION
CONSTRUCTION OFFICE

CHAPTER I
INTRODUCTION

CHAPTER II
CONCRETE

CHAPTER III
DESIGN

CHAPTER IV
TRAF. CONT. & SAF.

CHAPTER V
EQUIPMENT

National Concrete QA Program

Ensuring Quality in the Concrete Paving Process

- Not details of all aspects of a QA program
- But it is-
 - Why should you care
 - What's in it for the agency
 - What's in it for the contractors
 - Promoting use of concrete pavements

Program Elements

- FHWA Mobile Concrete Lab
 - Testing on an active project for 2 weeks
- Executive Briefing
 - Agency Administrators
 - Contractor Owners
- 2 Day Concrete QA Seminar
 - Reference/guidance materials
- Follow up assistance



FHWA Mobile Concrete Lab

- Comes to an active project before the seminar
- Spend about 2 weeks
 - Running tests on production concrete
 - Demonstrating new equipment
- Data used to illustrate QC and acceptance principles during the seminar
 - Real time data from project
 - Correlated to local materials
 - Statistical analysis provided
 - Spec limits evaluated



Executive Summary

- Day before the seminar
- Agency top management
- Contactor owners, presidents, etc.
- Outline the principles and benefits
- Draw on project data where possible



Concrete QA Seminar

- Two days
- Six modules
- **Free to a state**
- State furnishes the facilities
- Agency engineers, inspectors, and technicians
- Contractor personnel



Module 1

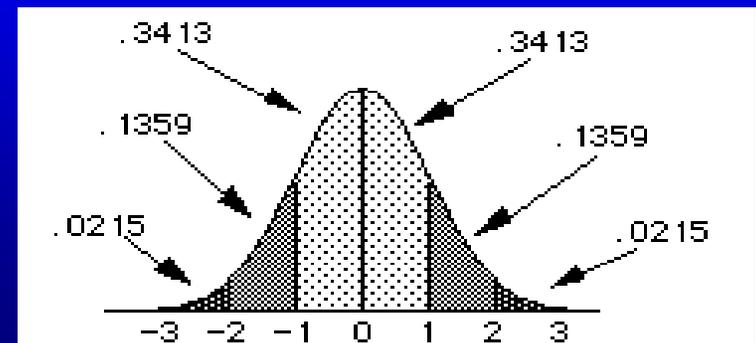
Quality Concepts

- Introduction to QA Concepts
- Define the terminology
- Emphasize that everyone has a stake in quality
 - Real world examples
- Benefits of a comprehensive quality program
 - To agencies and contractors

Module 1

Quality Concepts

- PWL, random sampling, and control charts
 - Concepts, not details
- Link between consistency and quality (performance and service life)



Module 2

How to Achieve Durable Concrete Pavements

- What is needed to achieve durable concrete pavements
- What do we test and inspect
- Why do we test and inspect
- Handouts
 - Testing Guide
 - Inspection Manual
 - Comprehensive list of resources



Module 3

Quality Assurance Program

- Elements of a QA Program
- Specification limits vs. engineering/action limits
- Limits vs. targets
- “Bad” test results vs. bad concrete
- Agency acceptance plan
- Elements of a QC plan
- Maine Specification



MaineDOT's QC Plan

- Submitted and approved prior to any construction of QA spec items
- Includes all the components of a traditional plan

PLUS

- Contractor's method of complying with specs for non-measurables that significantly affect quality

➤ Financial penalties for violating QC Plan



Module 3

Quality Assurance Program

- Reliable test data is critical
 - Tester qualification
 - Tester diligence
 - Test procedures
 - Testing equipment
- Communication
- Pre-placement meeting
- Checklists will be discussed and provided



Module 4

Quality Concepts for Mixture Production

- Selecting materials, stockpile management, combining materials, mixing, etc.
- Importance of a good mix design
- How managing risk affects bidding
- How control of the operation gives the contractor competitive advantages
- Project construction planning



Module 5

Quality Concepts for Paving Operations

- Constructing and inspecting concrete pavements
 - Machine set up, stringline, vibrators, curing, sawing, etc.
- ACPA's Concrete Pavement Field Reference *Pre-Paving*
- HIPERPAV
- Field Inspection Manual (Text)



Module 6

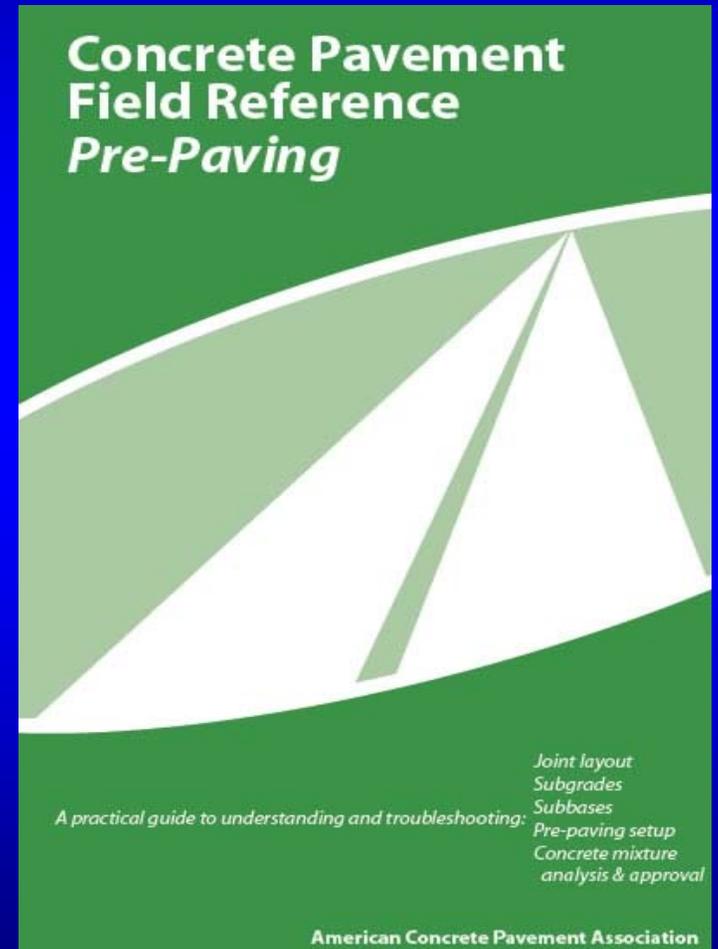
State Field Data

- Data from mobile lab on local project
- Project quality assessment
 - Testing data
 - Inspection
- Specification analysis
- Feedback to agency and contractor
 - Quality
 - Costs
 - Efficiencies



Resources Provided

- References provided to attendees
 - Testing Guide
 - ACPA: Concrete Pavement Field Reference *Pre-Paving*
 - Inspection Guide
 - Others



Implementation Timeframe

- Program hits the road: Summer 2010
 - State DOT's can request
 - **Free** of charge
- ACPA Chapters
 - Available next winter



**Book now while plenty of
good seats still remain!!**



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Go Red Sox!

