UPDATE: Performance Engineered Concrete Mixtures and Quality Assurance Program

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U.S.Department of Transportation

Federal Highway Administration

Motivation

- MAP-21 legislation focuses on performance
- Desire by Public Agencies and Industry to move toward performance
  - Optimized mixture designs (gradation, cement content, cont.)
  - Improved durability
  - Sustainability

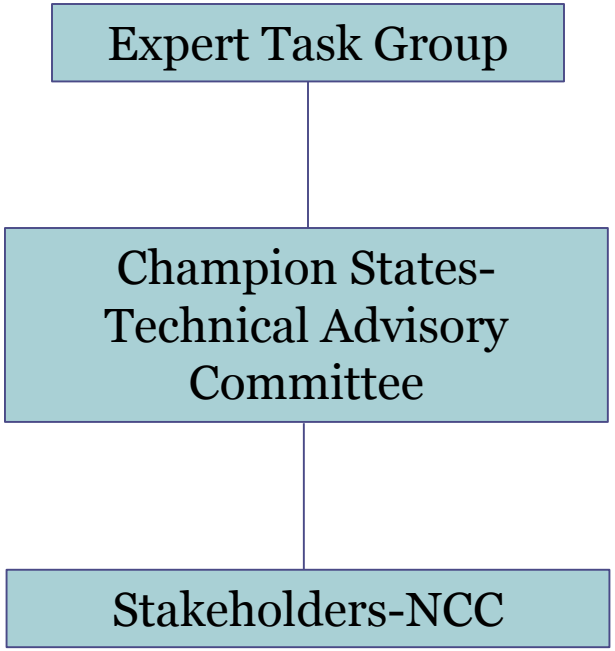
Why Now?

- Knowledge about performance based concrete paving mixtures is available
  - Ternary pooled fund project TPF-5(117)
  - Work by industry and academia
- Synergy with other funded research
  - NCHRP 20-7 on F factor
  - TPF- 5(297) on SAM
- Funding and Mechanisms are currently available
  - MAP 21 funds
  - FHWA Cooperative Agreements with CP Tech and ACI

Our (Lofty) Vision

- Implement the adoption of performance engineered concrete mixtures.
  - Accelerated evaluation of key new test methods (In progress -Champion States summer 2015)
  - Develop a draft AASHTO (provisional) specification (In progress- draft Spring 2016)
  - AASHTO ballots provisional specification for performance engineered concrete mixtures (August 2016)
  - Parallel testing with States using draft specification (2016/2017)

How do we get there?



Expert Task Group (ETG)

- Experts from Academia, Industry, DOT's
  - Gina Ahlstrom, FHWA
  - Tom Cackler, CP Tech/Woodland Consulting, Inc.
  - Mark Felag, Rhode Island DOT
  - Doug Hooten, University of Toronto
  - Ken Hover, Cornell
  - Cecil Jones, ACI/Diversified Engineering Services
  - Steve Kosmatka, PCA
  - Tyler Ley, Oklahoma State
  - Colin Lobo, NRMCA
  - Maria Masten, Minnesota DOT
  - Mike Praul, FWHA
  - John Staton, Michigan DOT
  - Peter Taylor, CP Tech
  - Mike Tholen, ACI
  - Paul Tikalsky, Oklahoma State University
  - Gerry Voigt, ACPA
  - Tom Yu, FHWA

Role of ETG

- Cooperatively develop a framework and implementation plan for Performance Engineered Concrete Mixtures

- Meet periodically with the goal of implementation
  - First meeting April 2014
  - Second meeting April 2015

Outcome from First ETG Meeting

HARDENED CONCRETE	**PLASTIC CONCRETE (Agency)**	**PREQUALIFICATION**	
		Agency	**Contractor**
1. Mechanical properties modulus abrasion 2. Freeze/thaw 3. Permeability 4. Volume change	Identity properties 1. Unit weight 2. Air properties 3. Water ratio 4. Workability placeability paveability	Evaluation➔➔ All ingredients MRD Mixtures	←←Design Compatibility Aggregate system Mixture properties Quality Plan

Champion States

- Indiana
- Iowa
- Michigan
- Minnesota
- Nebraska
- South Dakota
- Wisconsin
- Illinois Tollway
- Manitoba

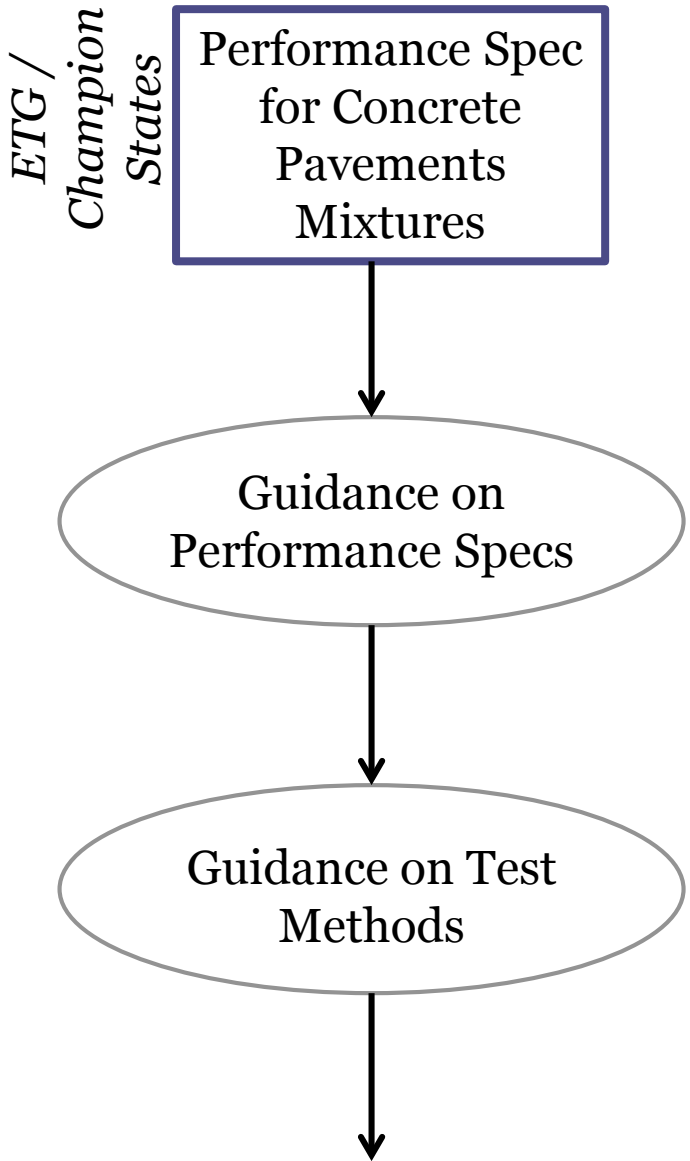
Role of Champion States – Technical Advisory Committee

- Champions - Lead Adopters
- Focus on implementation of the specification
- Assistance with data gathering on promising new tests
- Consideration of performance specification/parallel testing of new specification

Role of Stakeholders-National Concrete Consortium (NCC)

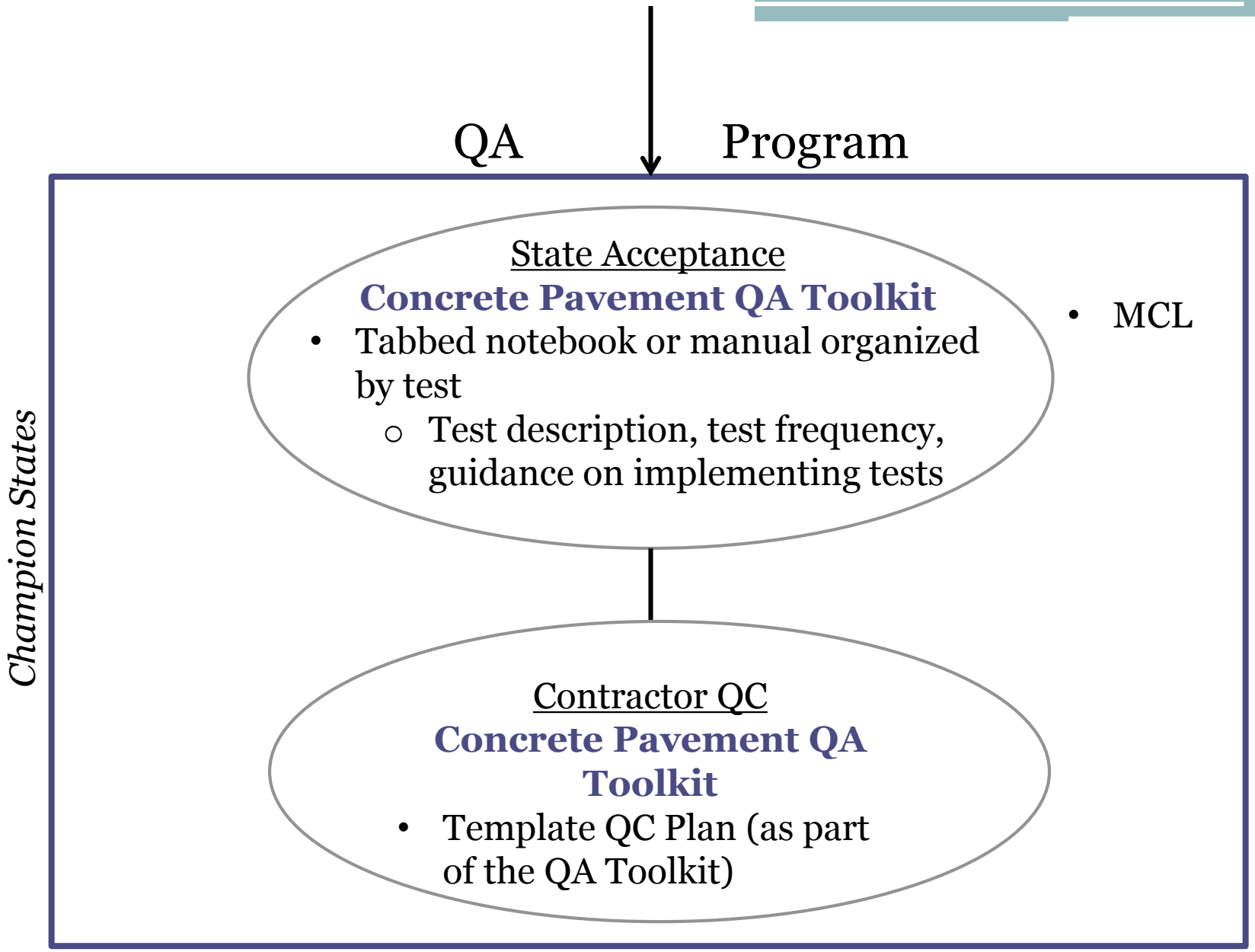
- Review the draft AASHTO specification
- Provide feedback and input on implementation of the specification
- Provide feedback and input on the **Quality Assurance Program**

Concrete Pavement Performance System



- Workshops

- You Tube videos
- One Pagers
- MCL Support


QA Program
Champion States
State Acceptance
Concrete Pavement QA Toolkit
• Tabbed notebook or manual organized by test
○ Test description, test frequency, guidance on implementing tests
• MCL
Contractor QC
Concrete Pavement QA Toolkit
• Template QC Plan (as part of the QA Toolkit)

Next Steps

- "2015 Summer of Data Gathering"
- Report early results at the fall NCC meeting
- Refine draft AASHTO specification
  - Review by TAC and NCC Spring 2016
- Further define the QA Program
- Stakeholder support → AASHTO support