



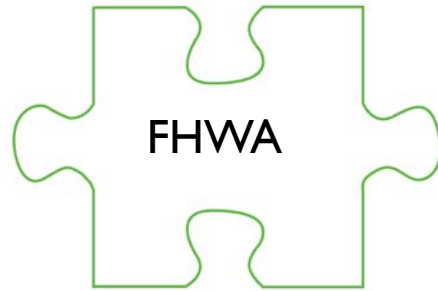
U.S. Department of Transportation

Federal Highway Administration

FHWA UPDATE ON CONCRETE PAVEMENT ACTIVITIES

GINA AHLSTROM, MIKE PRAUL, AHMAD ARDANI, RICHARD DUVAL

WHO IS HERE FROM FHWA?



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MAJOR (CONCRETE) PROGRAM AREAS

ADVANCING PERFORMANCE ENGINEERED CONCRETE MIXTURES

CONCRETE PAVEMENT PERFORMANCE SYSTEM



PERFORMANCE RELATED SPECS (PRS)

IMPLEMENTATION OF PERFORMANCE ENGINEERED CONCRETE MIXTURES (PEM)

Background:

- Focal point for moving concrete specifications and practices in a performance direction; Requires tests that correlate to performance
- ETG included FWHA, State DOTs, academia, and industry (initiated 2013)
- Provisional specification PP 84-17 published by AASHTO
- Internal FHWA Team- HQ, TFHRC, RC

Planned Activities:

- Continue to refine test methods and equipment (Mobile Concrete Trailer participating)
- Pooled Fund TPF-5(368) to further test methods and implementation support
- ACI Workshop piloted and refined...AVAILABLE! 
- Significant collaboration with FHWA-TFHRC
- FHWA Implementation Support through funding 

CONCRETE PAVEMENT PERFORMANCE SYSTEM

Background:

- Builds on PEM
- Develop and assist with implementation of a performance-driven concrete QA Program at the State level, with an increased emphasis on QC requirements

Planned Activities:

- Development of a QA toolkit for implementation
- Development of a QC template for contractors
- Mobile Concrete Trailer to play a major role in implementation support
 - Videos
 - Shadow Testing (PEM and PRS), Pilot Projects

MOBILE CONCRETE TRAILER (MCT)

Background:

- Provides a link between research ready tests, technical guidance, and implementation
- Provides a national view of concrete materials and construction allowing for development of policy and technical guidance
- MCT visits projects in 4-6 states per year; also participates in conferences/other training opportunities
- Demonstrates post-research products that are ready for implementation
- Assists TFHRC and others with research testing needs, as time allows



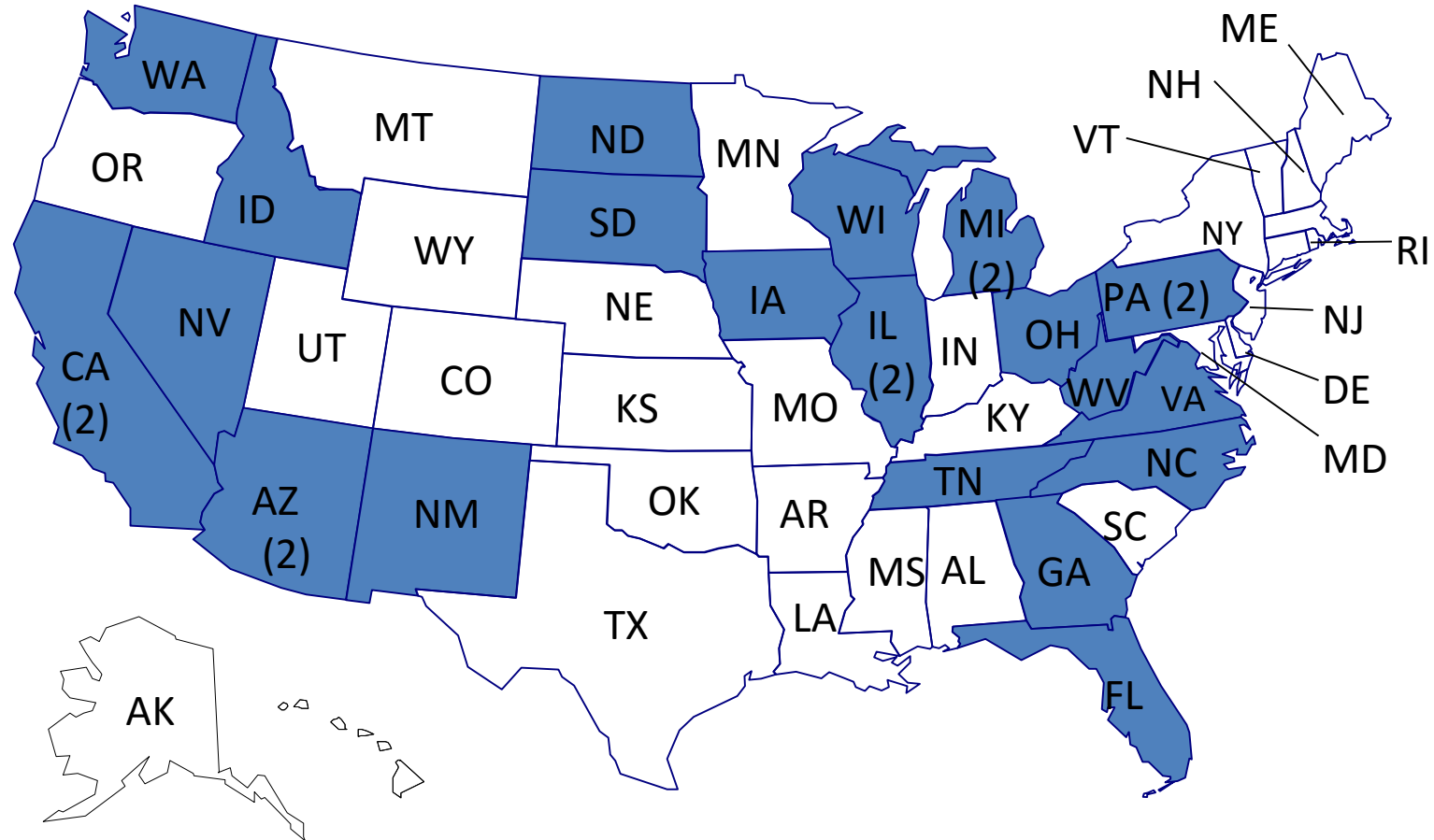
MOBILE CONCRETE TRAILER (MCT)

Planned Activities :

- Field visits to: CO(PRS), HI, DE, IA, UT, MN, TX(PRS-tentative)
- Quality in the Concrete Paving Process workshop (same States as field projects)
- PEM testing support
- Equipment loan program
- Conference demonstrations currently planned (OH, AZ, MD, TX)
- Develop “one pagers” highlighting best practices and lessons learned from project visits and trends identified by MCT work
 - “Reducing Cement Content” and “Optimizing Mix Design” have been published
 - Four planned (Cores vs. Cylinders for Acceptance, MIT Scan T2, Surface Resistivity, Maturity Method)

QUALITY IN THE CONCRETE PAVING WORKSHOP

COMPLETED AS OF AUGUST 2017



■ 28 Workshops in 20 States





RELATED RESEARCH

IN- HOUSE AT FHWA-TURNER FAIRBANK HIGHWAY RESEARCH CENTER (TFHRC)



FHWA-TFHRC / OSU COLLABORATION ON PEM

- New test methods have been proposed as part of the AASHTO PP84, Tier 1 PEM specification
- These test methods need to be refined/validated
- Data using these tests on a wide range of mixtures are needed to predict performance, in support of PRS

PEM RELATED ACTIVITIES AT FHWA-TFHRC

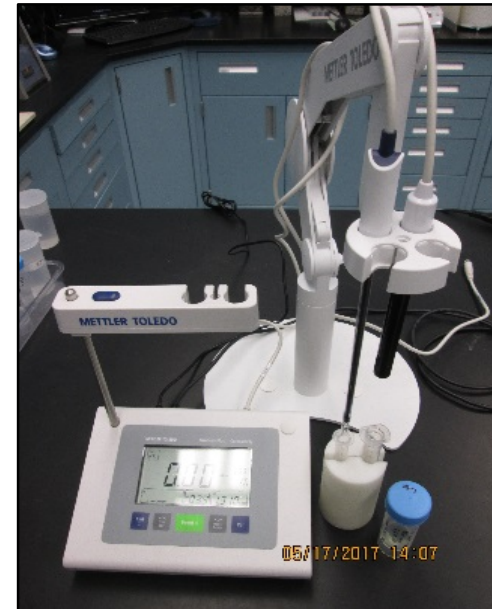
- Use of a wide range of mixtures to independently validate tests
- These mixes will:
 - ✓ Contain a wide range of materials' chemistry
 - ✓ Represent a wide range of mix proportions reflecting DOTs mixtures

PEM RELATED ACTIVITIES AT FHWA-TFHRC

■ Test validation:

Formation Factor related tests

- Pore solution extraction practice
- Pore solution electrical resistivity test
- Pore solution elemental analysis through XRF test
- Proposed modifications to surface resistivity test
 - TP119 and TP95



PEM RELATED ACTIVITIES AT TFHRC

- Test validation:

 - Concrete freeze-thaw durability related tests

 - Recent approved test for paste damage due to salt exposure (calcium oxychloride formation)
 - Concrete damage due to salt exposure test
 - Concrete critical saturation test

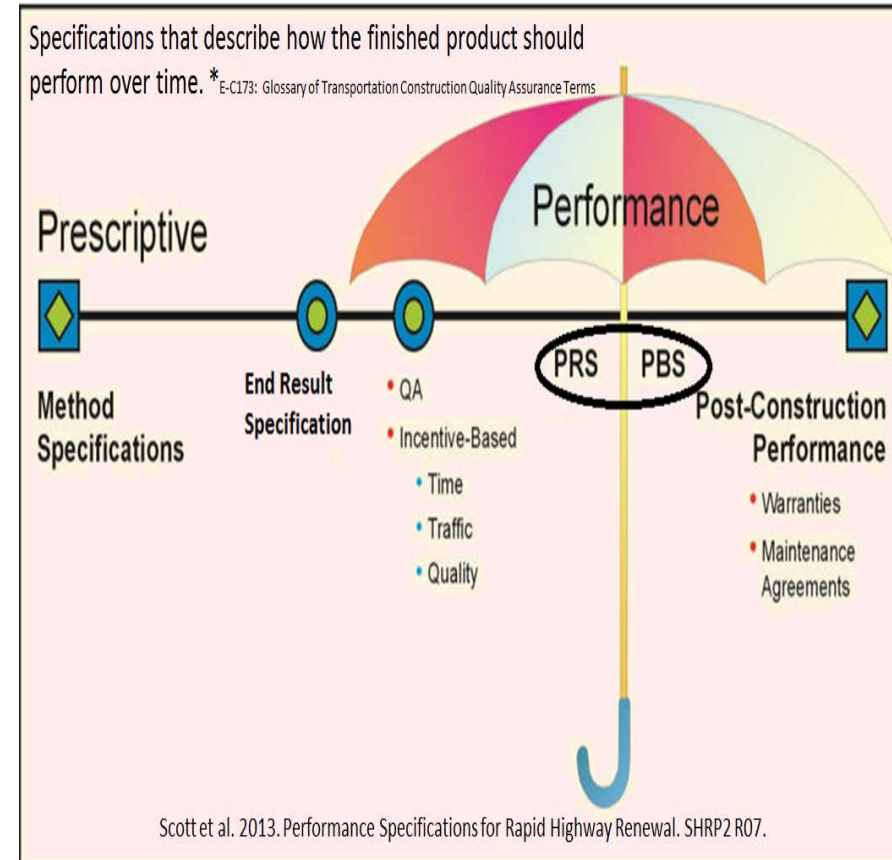
PEM RELATED ACTIVITIES AT TFHRC

- Test validation:
 - Concrete transport related tests
 - Modified C642, absorption test
 - Modified C1585, absorption test
- Develop a test result database for these tests to support the development of models and the advance of PRS

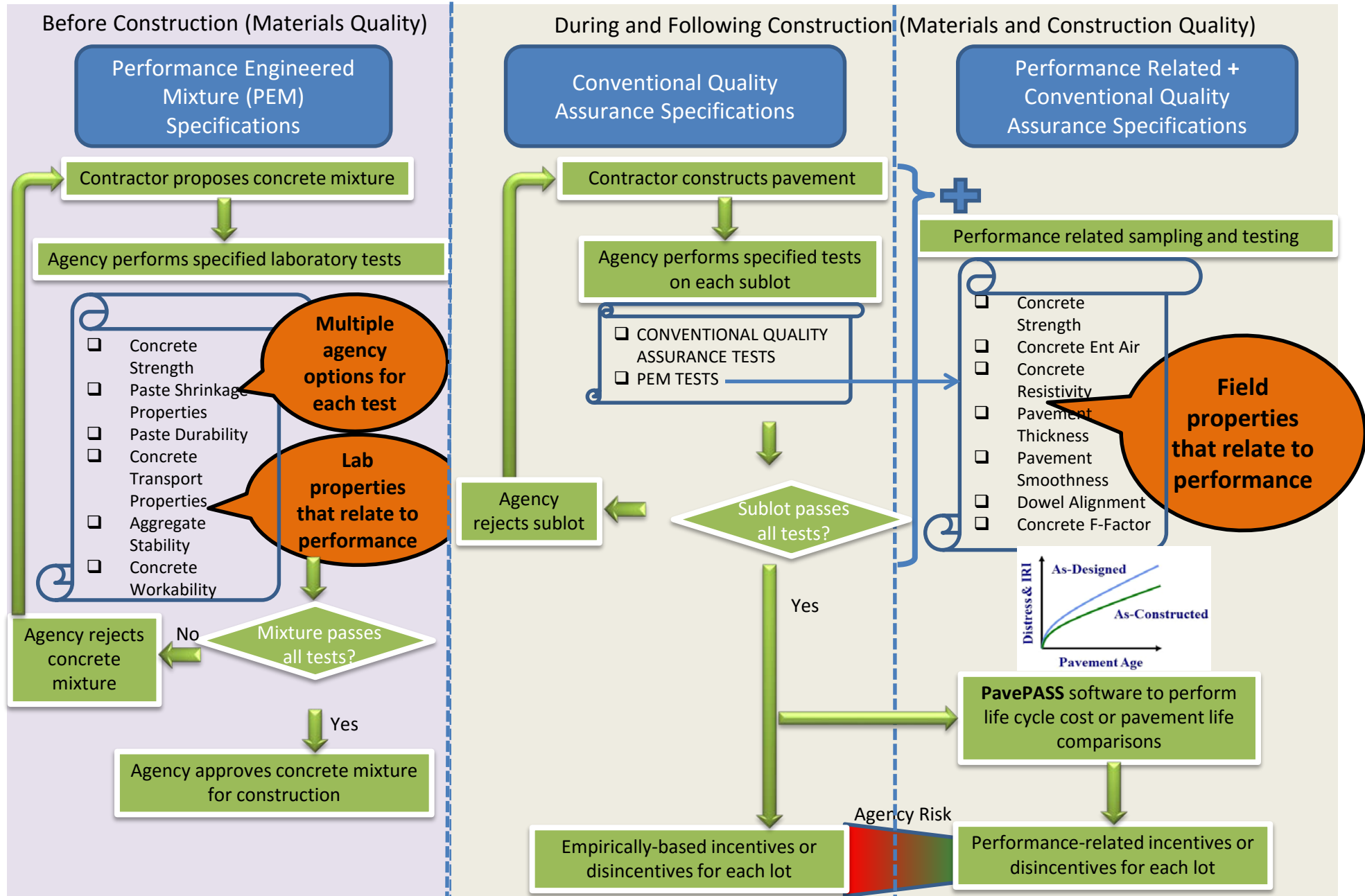


QA and Performance Continuum

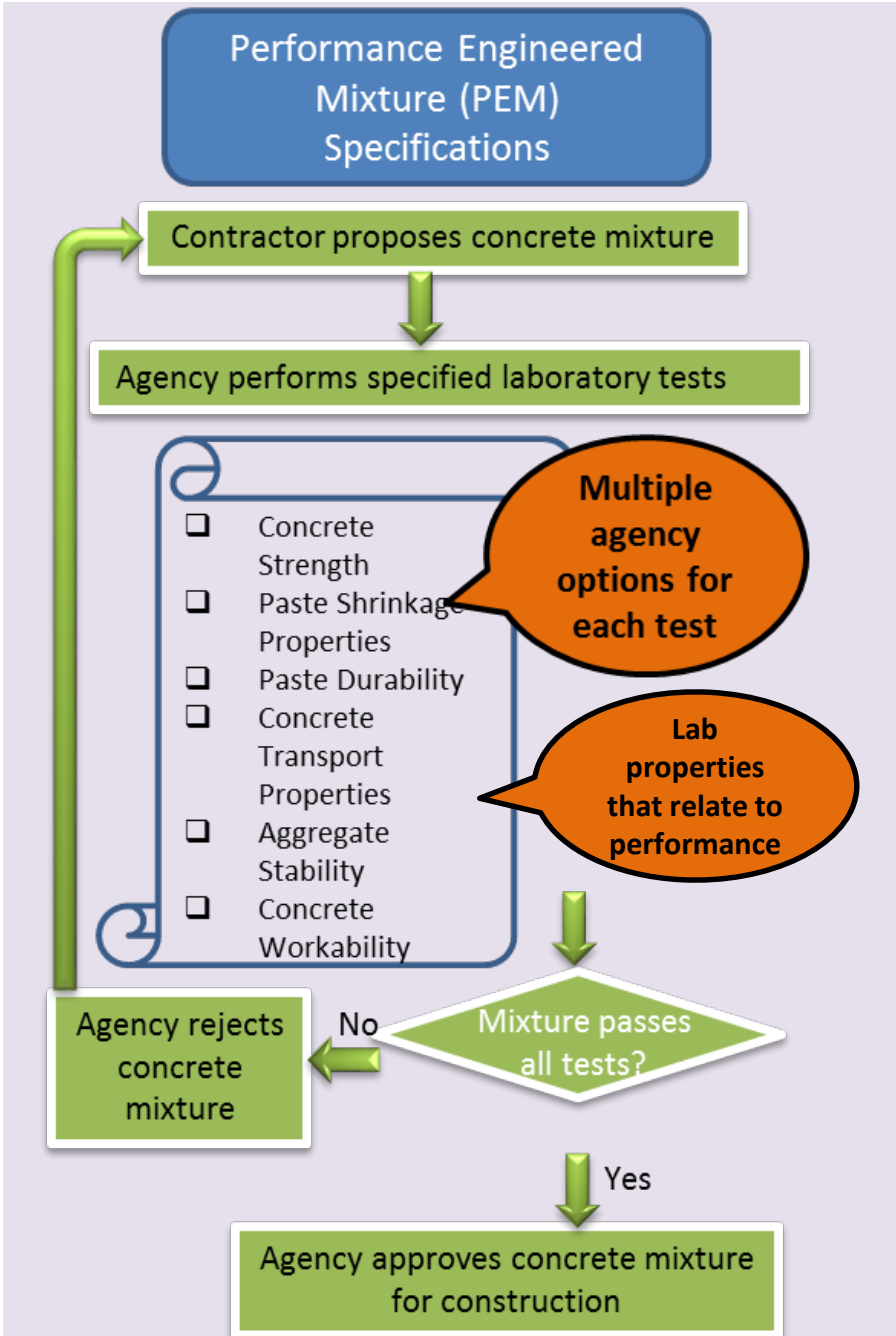
- **PEM Specifications-** establishes concrete PERFORMANCE mixture properties; Field Construction monitoring and approval would be handled through PERFORMANCE Related Specifications (PRS) along the QA continuum
- **Tests Specification Development for Performance-** FHWA is collaborating with Dr. Weiss/Oregon State University to help create and refine the test specifications included in the PEM



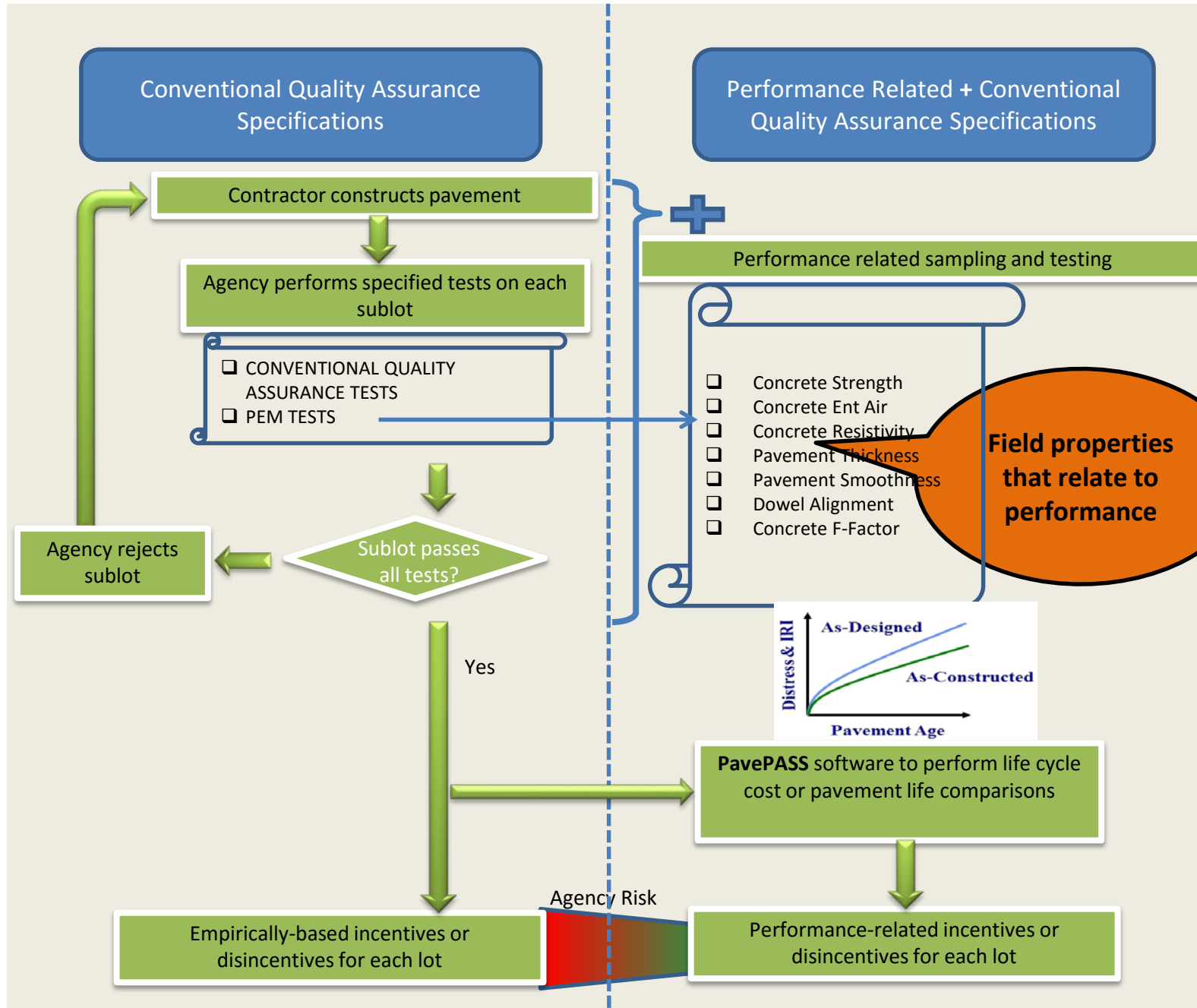
Performance Driven QA and Link to PRS



Before Construction (Materials Quality)



During and Following Construction (Materials and Construction Quality)



PRS SHADOW PROJECTS

- Illinois Tollway – Implemented beyond shadow
- Colorado DOT – Sept 2017 (Mobile Concrete Trailer participation)
- Texas DOT – Fall/Winter 2017-2018
- Seeking Additional DOT Shadow projects
 - (Contact: Richard Duval, 202-493-3365)

QUESTIONS?

FWHA HQ- MOBILE CONCRETE TRAILER

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