

# Balanced Mix Design (BMD) Task Force Update



**FHWA MIXTURE / CONSTRUCTION ETG**

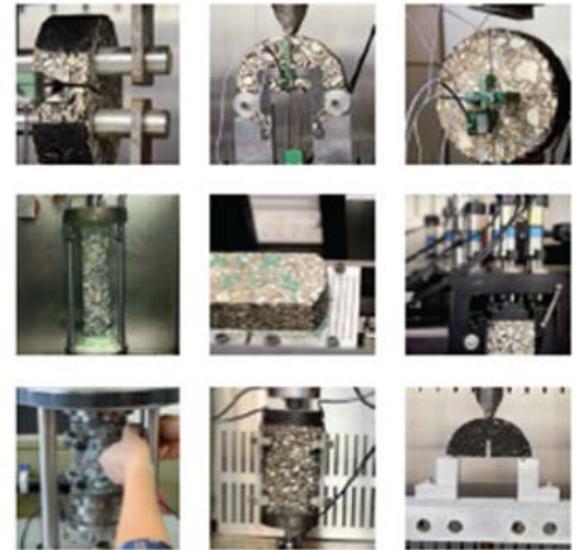
**FALL 2016**

**SHANE BUCHANAN**



# Task Force Development – Brief History

- Balanced Mix Design Task Force formed at the September 2015 ETG meeting in Oklahoma City
- Task Force is now 1 year old (or 7 in Dog years!)
- Membership is a great group of people focused on improving mix quality and performance!
- Actively sought out and gained more agency membership.





# BMD Task Force Membership

Name	Affiliation	Category	e-mail
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# BMD Task Force Work Items

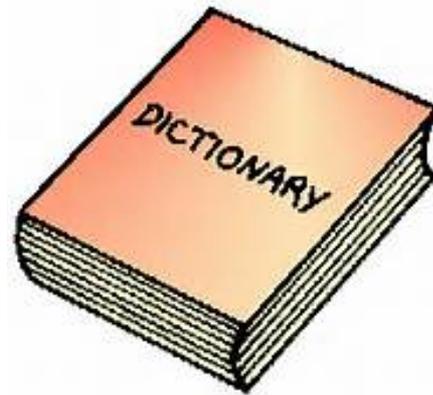
- **Completed**

- Definition of Balanced Mix Design
- Survey of Agency Current Practice
  - ✦ Laboratory Balanced Mix Design Protocols
  - ✦ Field Acceptance Protocols
- Research Problem Statement (RPS) Submitted to AASHTO)

- **Current**

- FHWA Technical Brief on Balanced Mix Design
  - ✦ Draft prepared, reviewed and being revised

# Balanced Mix Design Definition

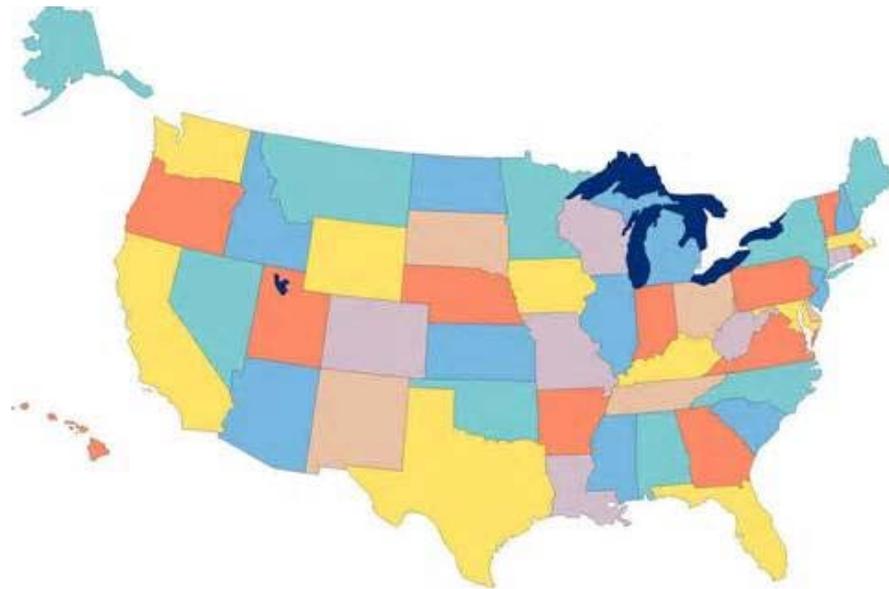




## Balanced Mix Design Definition

- *“Asphalt mix design using performance tests on appropriately conditioned specimens that address multiple modes of distress taking into consideration mix aging, traffic, climate and location within the pavement structure.”*

# Agency Practices Related to BMD



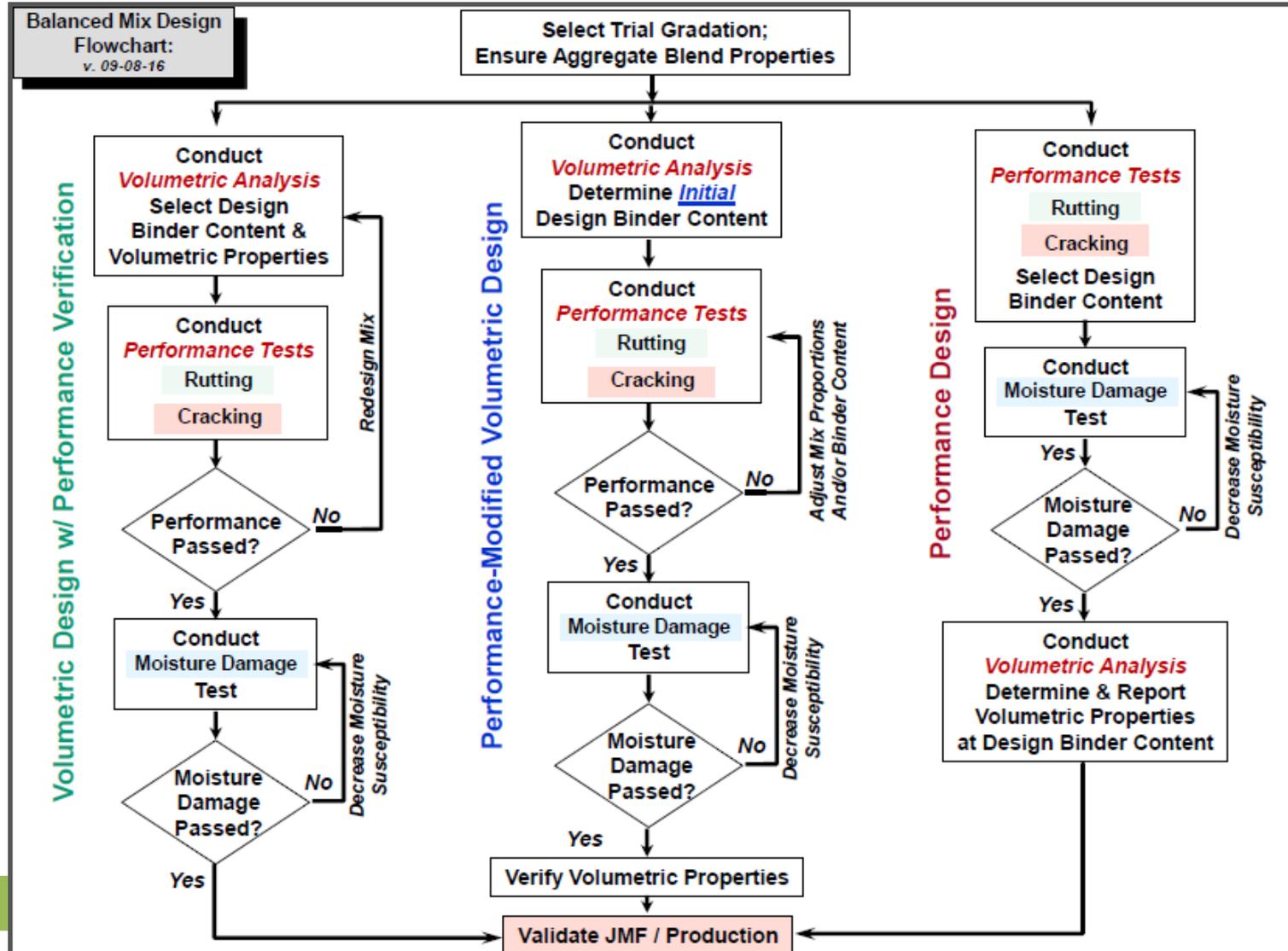
Prepared by the Geographic Names and  
Location of Address



# Agency Approaches Identified – Revised Descriptions

- **Performance Design** – this involves conducting a suite of performance tests at varying binder contents and selecting the design binder content from the results. Volumetrics would be determined as the ‘last step’ and reported – with no requirements to adhere to the existing M323 limits. Example States: New Jersey w/ draft approach
- **Performance-Modified Volumetric Design** – the initial design binder content is selected using M323/R35 prior to performance testing; the results of performance testing could ‘modify’ the mixture proportions (and/or) adjust the binder content – and the final volumetric properties may be allowed to drift outside existing M323 limits. Example State: California
- **Volumetric Design w/ Performance Verification** – basically, it is straight Superpave with verifying performance properties; if the performance is not there, start over and re-design the mix. Volumetric properties would have to fall within existing M323 limits. Example States: Illinois, Louisiana, New Jersey, Texas, Wisconsin

# Agency Approaches Identified – Revised Single Flowchart



# BMD TF Work Products

Research Problem Statement  
+  
FHWA Technical Brief





# Research Problem Statement

- RPS prepared by the BMD TF in June 2016
- Anticipated Results
  - 1) review of the state-of-the-practice for asphalt mixture design,
  - 2) review the development and state-of-the-practice for performance testing,
  - 3) development of a Recommended Practice for Balanced Mixture Design to implement performance testing in the design of asphalt mixtures, and
  - 4) development of a training and implementation plan and materials to move BMD ahead in State Highway Agencies (SHAs).

## NCHRP Problem Statement

### I. PROBLEM NUMBER

To be assigned by NCHRP staff.

### II. PROBLEM TITLE

Development of a Recommended Practice for Balanced Asphalt Mixture Design

### III. RESEARCH PROBLEM STATEMENT

#### Background

In September 2015, the FHWA Expert Task Group on Asphalt Mixture and Construction formed a Task Force on Balanced Mixture Design (BMD) to move forward changes in the way asphalt mixtures are formulated. The task group has defined BMD as “*Asphalt mixture design using performance tests on appropriately conditioned specimens that address multiple modes of distress taking into consideration mixture aging, traffic, climate and location within the pavement structure.*” The objective of BMD is to design asphalt mixtures for performance using a rational approach instead of relying on strictly volumetric guidelines. The Task Force has identified three types of approaches used for a Balanced Mixture Design: A) Performance Testing, B) Superpave with Adjustments Based on Performance Testing and C) Superpave with Adjustments Based on Volumetrics and Performance Testing.



BMD RPS



# Research Problem Statement – External Review Notes

- RPS was reviewed by several external sources prior to submittal for guidance and input
  - Dr. Ed Harrigan, NCHRP
  - Skip Paul, Retired LTRC
  - Jack Springer, FHWA
- Valuable input related to project phasing, costing, and layout

## VI. ESTIMATE OF PROBLEM FUNDING AND RESEARCH PERIOD

**Recommended Funding:** Phase I - \$1,000,000  
Phase II - \$700,000 (2020, 2021)

**Research Period:** Phase I: 36 months  
Phase II: 24 months



# Research Problem Statement – AASHTO Update



- Favorable response during August SOM
- Comments from Oak Metcalfe (TS 2d Chair)...
  - *Technical Section chairs to rank all the proposed research statements that were submitted during the SOM meeting at the beginning of August.*
  - *There are eight total research statements from the SOM with the BMD statement being the only one in the area of asphalt mixtures or binder. (There are several in the area of pavement preservation, including fog seals)*
  - *Rank each RPS on a scale of 1 to 5, with 5 being the highest priority. Our rankings are due to Jack by the 16<sup>th</sup> of September and there will be a group call to decide the final rankings on September the 23<sup>rd</sup>.*



# Research Problem Statement – ~Schedule

- Problem Statements Solicited: July 2016
- Problem Statements Due: October 2016
- Evaluations sent to Submitters: Early December 2016
- Ballot sent to SCOR and RAC Members: Mid-December 2016
- Ballot Due: February 2017
- SCOR Meeting: March 2017





# FHWA Technical Brief - Draft

- Tech Brief prepared and reviewed by full ETG.
- Revision work currently being handled by the task force.
  - Good document being made better
- Target October for final draft.

## TechBrief

The Asphalt Pavement Technology Program is an integrated, national effort to improve the long-term performance and cost effectiveness of asphalt pavements. Managed by the Federal Highway Administration through partnerships with state highway agencies, industry and academia the program's primary goals are to reduce congestion, improve safety, and foster technology innovation. The program was established to

## Balanced Mixture Design Approaches for Asphalt Pavement Construction

This *Technical Brief* provides an overview of balanced mixture design (BMD) approaches used by states in asphalt pavement construction. These approaches are still under development and this document will attempt to show its current status and some of the issues that will need to be addressed in the future.



# Thoughts and Questions?

