



BALANCED MIX DESIGN IMPLEMENTATION UPDATE

 Andy Babish, P.E.

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VDOT Objective

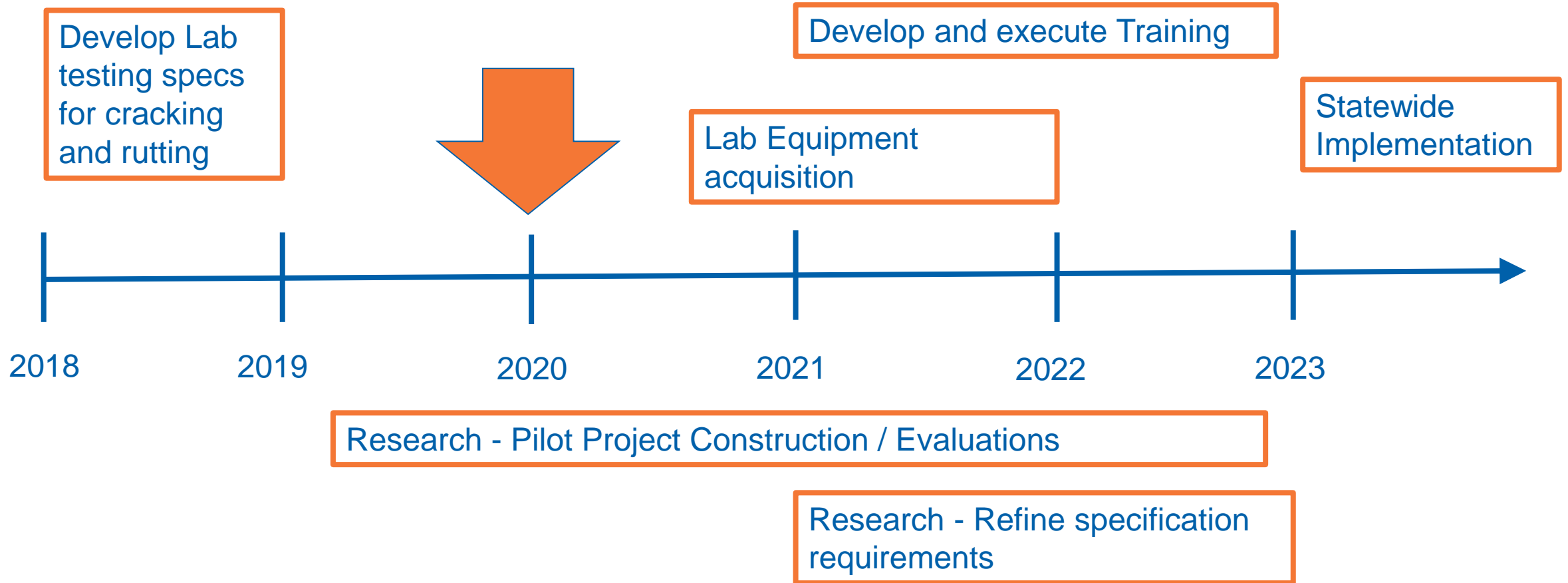
Why move to BMD approach?

Achieve improved pavement performance; optimization of cracking and rutting resistance using Balanced Mix Design methodology.

Foster innovation; mix performance approach vs. totally prescriptive specifications, incentivize quality attributes.

National standards; next generation of mix design standards, national trends; AASHTO adoption, NAPA support,

Status



Status

Research activities to date:

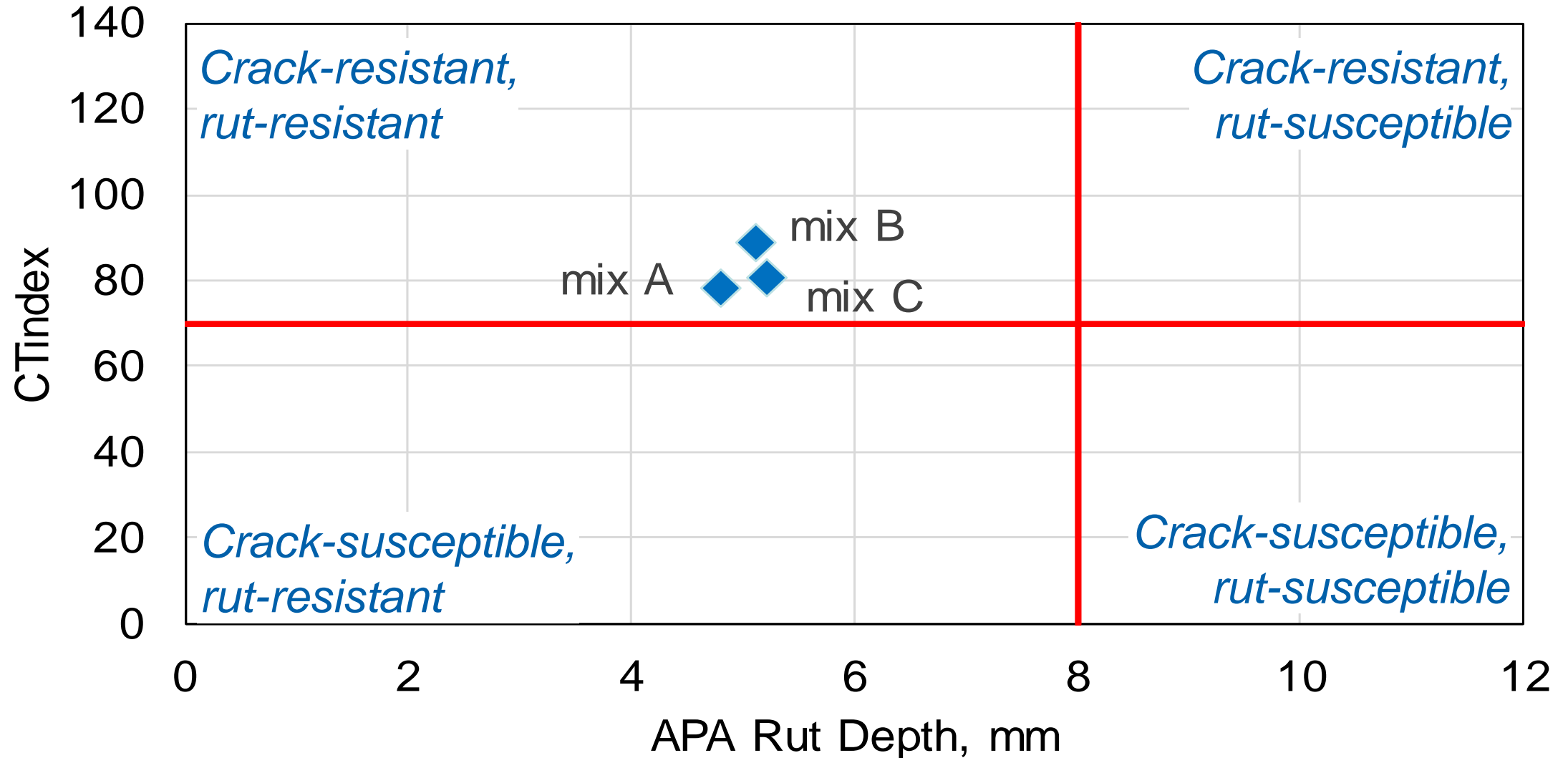
- **Baselining current surface mixes against cracking, rutting, and durability performance metrics**
 - 13 mixes from 2018
- **Gathering data on experimental mixes**
 - **Balanced Mix Design Field Trials**
 - High RAP and use of rejuvenators and softer binders
 - 2 projects to date, 8 mixes
 - NoVa and Salem/Lynchburg districts

Status

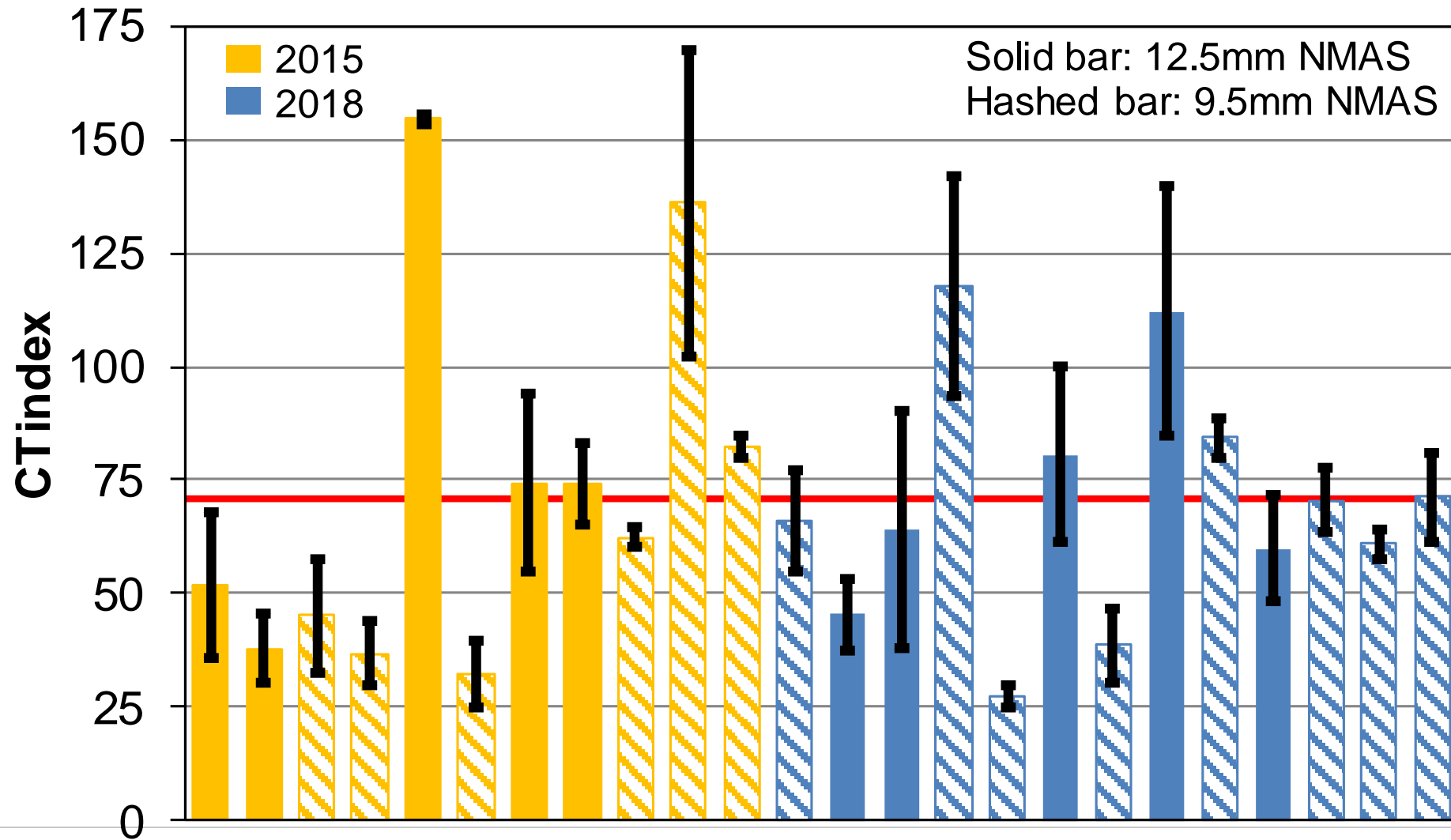
2019 BMD Projects

Date	District	Producer	Location	Mixes
June 27-28 July 15-18, 24-25 Aug. 22, 26-27	NoVa	Superior Paving	Logmill Rd. Catharpin Rd.	SM-9.5 30% RAP PG 64S-22 SM-9.5 40% RAP PG 64S-22, rejuv. SM-9.5 40% RAP PG 58-28 SM-9.5 30% RAP PG 58-28 SM-9.5 40% RAP PG 64S-22
July 12, 17, 24	Salem & Lynchburg	Boxley	Rt. 460, Salem Rt. 60, Lynchburg	SM-9.5 26% RAP PG 64S-22 SM-9.5 26% RAP PG 64S-22, rejuv. 1 SM-9.5 26% RAP PG 64S-22, rejuv. 2

Example Performance Space



IDEAL CT Index – Production Mixes



Status – 2020 Plans

Research work in progress for 2020

- **Balanced Mix Design Field Trials**
 - Evaluate production mixes and field performance
 - Impacts of rejuvenators and/or softer binder
 - Typical and high RAP contents
- **Impact of Production Variability on BMD in VA**
 - Assess influence of production variability (AC, gradation) on mass loss, APA rut depths, and CTindex responses of mixes
 - Develop information to minimize risk of failures during production due to acceptable mix variability

Status – 2020 Plans

Research work planned for 2020

- **Feasibility of Using the IDT test for Evaluating Rut Performance**
 - Assess the use of a high temp IDT test (similar to IDEAL-CT) to assess rutting potential
- **Evaluating Rejuvenator Acceptance for Virginia: Test Protocols and Performance-based Threshold Criteria**
 - Develop a testing protocol to evaluate the effectiveness of rejuvenators in both short-term and aged condition
 - Provide performance-based parameter(s) with threshold limits/criteria for product acceptance

Status – 2020 Plans

The next BMD Technical Committee meeting is on Jan. 8, 2020

Potential agenda topics include:

- Experience from VTRC and contractors who did pilot projects in 2019
- Pilot needs for the 2020 paving season
- IDEAL-CT Round-Robin testing
- Updates on laboratory testing equipment
- Other research updates
- Selection Criteria for project/mixtures
- Where & when BMD might be applied (systems, routes, etc.)

Status – Beyond 2020

What lies ahead –

Lab test acceptance? Cracking, Rutting, Durability?

AC content and Gradation?

Quality attributes measured? F/A ratio, VMA, VTM?

What are the Production Testing requirements and Design Approval requirements?

What are the thresholds for cracking, rutting, durability to ensure improvements in mix quality?

Status – Beyond 2020

What lies ahead –

Training activities

- Workshop was held in October at Daniels Center in Fredericksburg, VA
- Modification of VDOT certifications related to mix design and plant operations over next 2 years
- Hands on training in house with equipment and test procedures to build production level familiarity, potentially shadow existing procedures initially.

VDOT BMD Updates – 2019 MAAE Conference

Thank you!