VTRC
Virginia Transportation
Research Council

We bring innovation to transportation.

Virginia's Pavement Research Program

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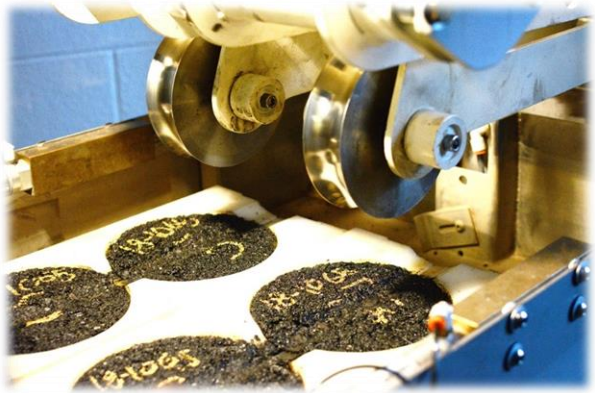
AREAS OF EMPHASIS

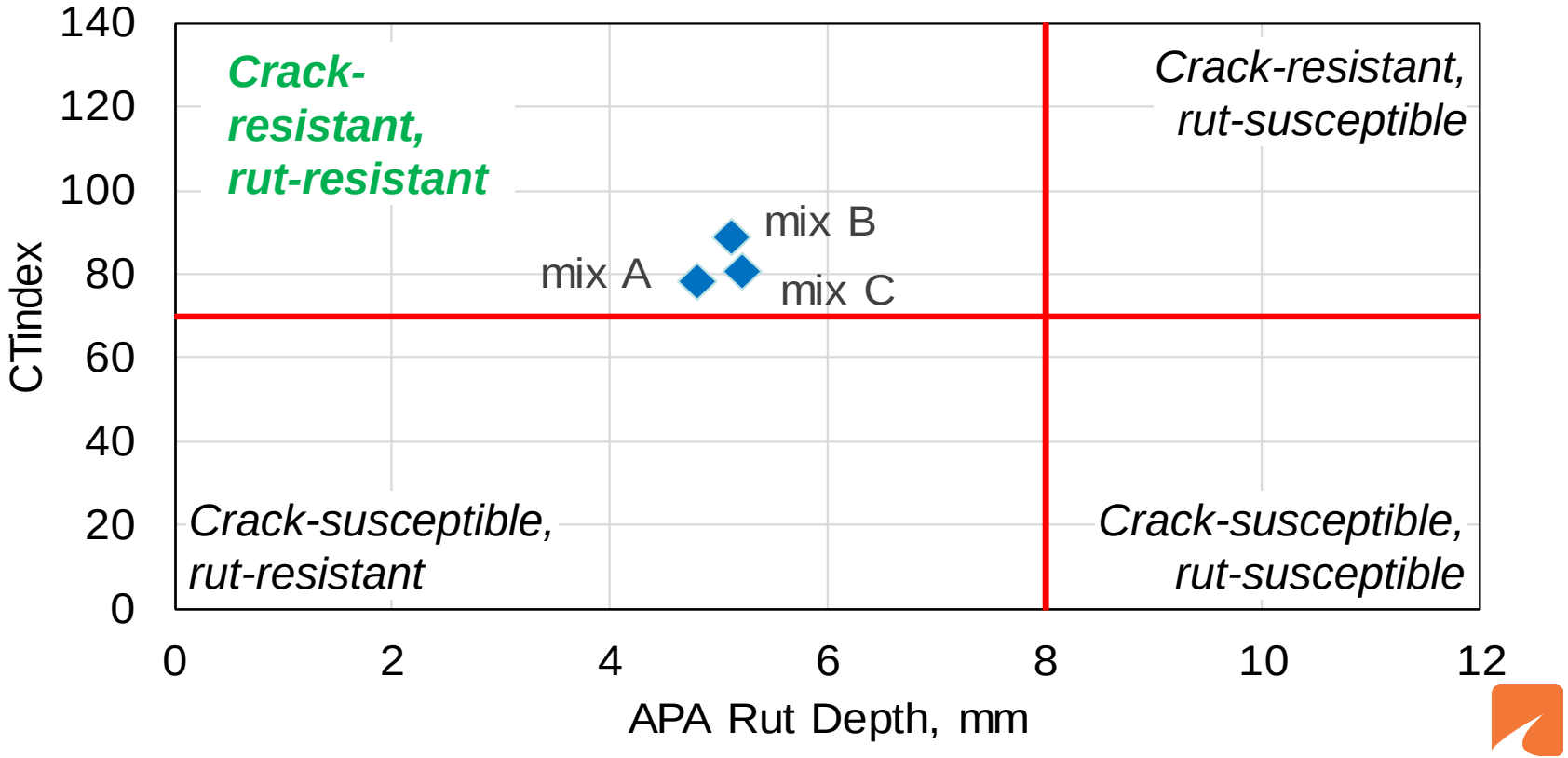
- Balanced Mix Design
- Innovative Materials
- Innovative Processes
- Mechanistic Design
- Rapid Evaluation
- Pavement Recycling

BALANCED MIX DESIGN

- Benefits:
  - Use mix performance, not prescriptive specifications
  - Incentivize quality attributes
  - Foster innovation
- Ultimate Goal:
  - improved pavement performance by optimizing cracking and rutting resistance
- Requires:
  - understanding/identifying how current mixes perform
  - determining desired performance



Example Performance Space

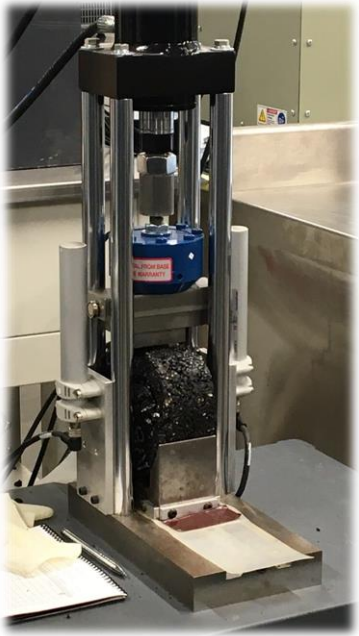


BMD Projects Underway

- Performance Mix Design – Phase I
  - Benchmark current mixes
  - Identify field projects for long-term performance
  - Develop “roadmap” to implementation
- BMD Field Trials
  - Production mixes and field performance
  - Rejuvenators and/or softer binder
  - Typical and high RAP contents
- Production Variability and BMD Criteria
  - Influence of production variables (AC, gradation) on mass loss, APA rut depths, and CTindex responses of mixes
  - Minimize risk of failures during production due to acceptable mix variability

Anticipated BMD Projects

- Using the IDT test for Evaluating Rut Performance
  - A cost-effective alternative to the APA?
- Rejuvenator Acceptance
  - Develop testing protocol to evaluate effectiveness of rejuvenators in both short-term and aged conditions
  - Provide performance-based parameter(s) and criteria for product acceptance

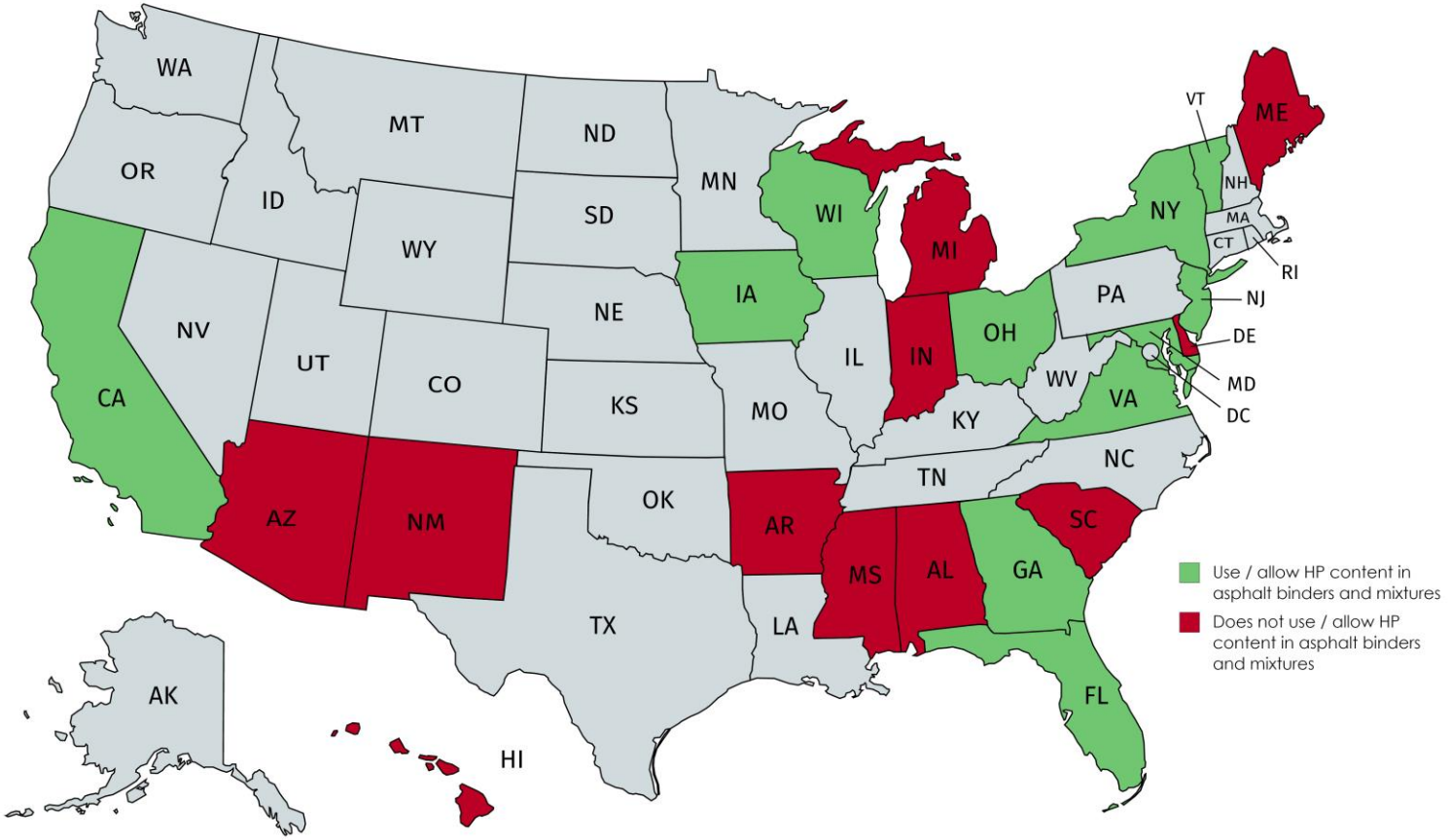


INNOVATIVE MATERIALS

Highly Polymer-Modified (HP) Asphalt

- Conventionally modified – 2-3% polymer content
- High polymer (HP) – >6% polymer contents
- Applications where pavements subjected to heavy and slow moving traffic loads
- Earlier phases of research:
  - Examined constructability, lab performance, and initial field performance
  - Recommended to mitigate reflective cracking

Highly Polymer-Modified Asphalt



Highly Polymer-Modified Asphalt

- Continued field performance and evaluation of cost-effectiveness in Virginia
  - Laboratory evaluation of field produced mixtures
  - Analyses of compiled PMS data for relevant in-service pavements located in Virginia
  - Cost analysis to quantify the expected benefits of HP modification

INNOVATIVE PROCESSES

Asphalt Rubber – Gap-Graded (Wet Process):

- I-85, Richmond District, jointed concrete
- Crumb rubber (17.5%) blended with asphalt before the binder is added to the aggregate

Ground Tire Modified Dense Graded Asphalt (Dry process):

- US 60, Richmond District, jointed concrete
- Rubber (10%) mixed with aggregate prior to asphalt

MECHANISTIC-EMPIRICAL PAVEMENT DESIGN/ANALYSIS

- Inputs for Intermediate and Base Asphalt Mixtures
- Inputs for Stone Matrix Asphalt (SMA) and Dense Graded Polymer Modified Mixtures
- MEPDG for rehabilitation design

RAPID EVALUATION

Structural Condition

Surface Safety

PAVEMENT RECYCLING

Life-Cycle Assessment

- Assessment of all VDOT recycling projects by Virginia Tech

I-81 Performance

- Annual performance measurements of project built in 2011

I-64 Instrumentation

- Instrumented test section on I-64 Segment II

NCAT Test Track

- 2 instrumented test sections built in 2012

NCHRP 9-62 – Rapid Quality Tests for Pavement Recycling

- Objectives
  - Identify or develop time-critical tests that provide agencies with a basis for determining when FDR, CIR, or CCPR can be opened to traffic and/or when it can be surfaced.
- Phase 1 - Literature and Specification Review
- Phase 2 - Lab testing to identify tests
- Phase 3 - Field testing to identify appropriate test values

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Thanks for your support of our research program!

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