DEVELOPMENT OF ASPHALT RUBBER BINDER SPECIFICATIONS IN CALIFORNIA: PROJECT UPDATE

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Background

- Update on the updates given at previous ETG meetings
- Recap on asphalt rubber (AR) in California
  - AB338 (2005) Caltrans to use AR in at least 35% of all AC placed
    - AR defined as 18-22% CRM by weight of binder
    - CRM is 100% passing #8 (2.36mm)
    - Termed “wet process”, used in gap- & open-graded mixes and chip seals
    - Current binder QC essentially only viscosity (handheld viscometer)
  - “Terminal blend” rubber binder (<250µm) used in dense-graded mixes tested according to Caltrans PG-M spec
  - Caltrans 2015 internal mandate requires that all surface courses placed below 3,000ft are asphalt rubber mixes
- SB1 funding will likely increase number of AR projects
Phase 1 (complete)

- Comparison of concentric cylinder with parallel plate on laboratory-produced AR binders

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<th>Size Range</th>
<th>Equation</th>
<th>R² Value</th>
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![Graph showing comparison of concentric cylinder with parallel plate on laboratory-produced AR binders.](chart.png)
Phase 2a (complete):

- Modification of RTFO test
  - Temperature increased to 190°C
  - Sample size increased to 45g
  - Included FTIR tests to assess affects of higher temperature
  - No change to PAV test
RTFO Testing

a) 35g at 163°C
b) 45g at 163°C
c) 35g at 190°C
d) 45g at 190°C
Phase 2a (complete):

- Modification of RTFO test
  - Temperature increased to 190°C
  - Sample size increased to 45g

- Intermediate temperature tests
  - 10 mm spindle / 13mm gap
  - Some issues still need to be addressed
Phase 2a (complete):

- Modification of RTFO test
  - Temperature increased to 190°C
  - Sample size increased to 45g
- Intermediate temperature tests
  - 10mm spindle / 13 mm gap
  - Issues still need to be addressed
- Modification of BBR specimen fabrication procedure
  - New molds
Phase 2b (complete):

- Write provisional test methods
  - Based on Anton Paar equipment
- Preliminary testing on plant produced binders and mixes
  - Includes rubber gradation and tests on base binder
  - Compare concentric cylinder and 25mm parallel plate with 3mm gap
- Update test methods as required
Phase 3 (In Progress)

- Provisional implementation
  - All 2018 AR projects will include concentric cylinder and 3mm gap PP testing by minimum of two laboratories in addition to current specification requirements
    - Continue development of intermediate temperature test
  - Report only
  - UCPRC will also do mix tests on selected projects
  - Finalize test methods
- Caltrans will decide which approach (CC or PP) to use based on results
Way Forward…

- Complete 2018 project testing
- Complete evaluation of PG grading criteria for AR binders (i.e., what do the numbers mean?)
- Revise/finalize test methods where required

Deliverables

- Finalized test methods
- Suggested specification language
- Interpretation guidance
- Final report