

DEVELOPMENT OF ASPHALT RUBBER BINDER SPECIFICATIONS IN CALIFORNIA: PROJECT UPDATE

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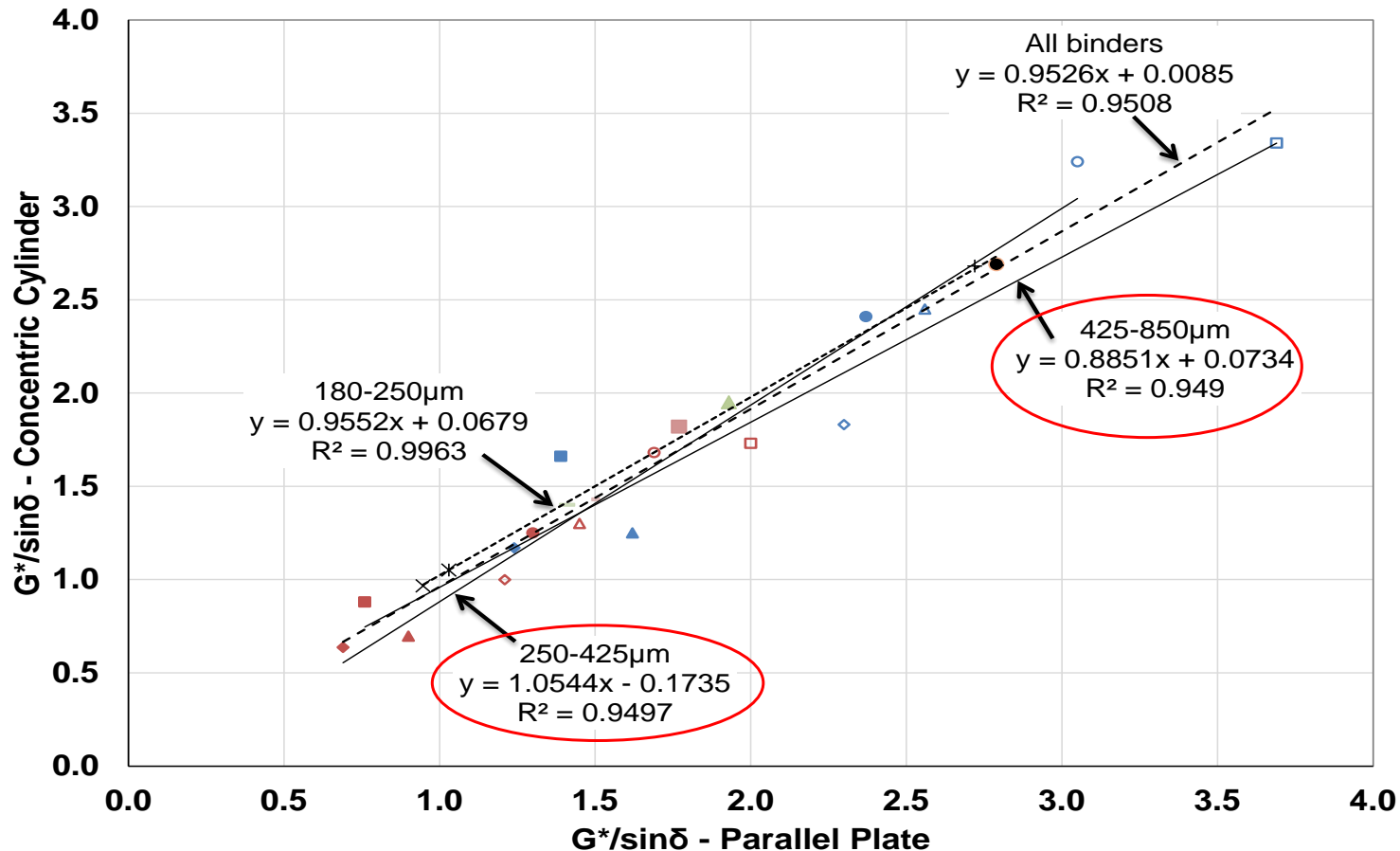


Background

- 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 (<250 μ m) 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



Phase 2a (complete):

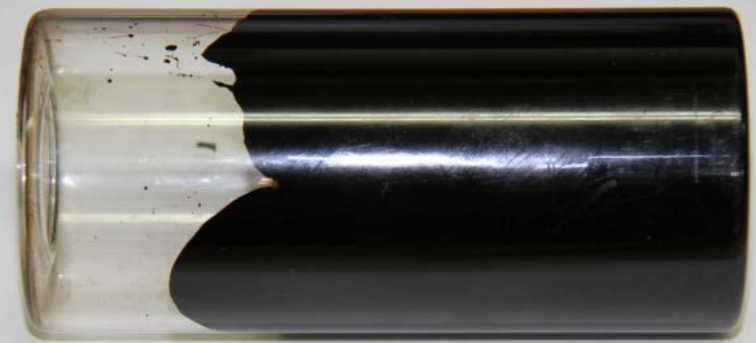
- Modification of RTFO test
 - Temperature increased to 190°C
 - Sample size increased to 45g
 - Included FTIR tests to assess affects of higher temperature
 - No change to PAV test



RTFO Testing



a) 35g at 163°C



b) 45g at 163°C



c) 35g at 190°C



d) 45g at 190°C

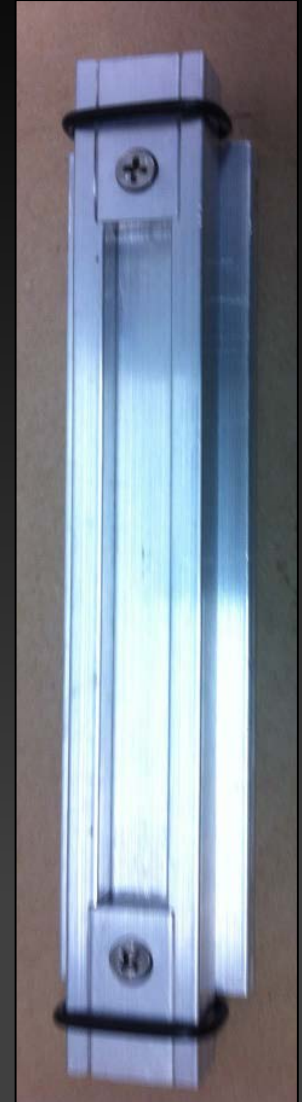
Phase 2a (complete):

- 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



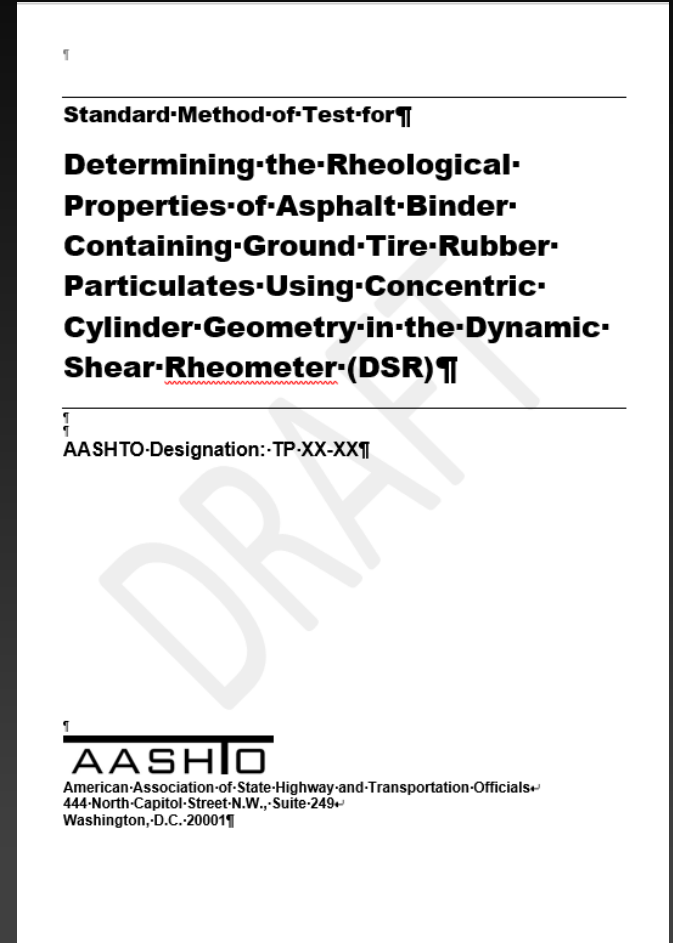
Phase 2a (complete):

- 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

Thank-you

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Photo courtesy Caltrans